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ABSTRACT

This handbook was produced as a result of a project that studied California community college programs that teach basic skills in vocational education programs. The project included a literature review, a telephone survey, and 12 site visits. The handbook contains four sections: (1) steps for integrating basic skills and vocational instruction; (2) profiles of eight model programs, including background, purpose, description, development process, recommendations for replication, and sample materials developed for the courses and programs; (3) a bibliography of 49 supporting/related resources; and (4) an appendix that contains the site visit interview schedule and survey instrument. The model programs profiled are the following: Workplace Learning Laboratory, MiraCosta College; Applied Mathematics for Electronics, San Jose City College; Occupational Readiness Program, Bakersfield College; Communication Skills Division--Basic Skills Program, San Joaquin Delta College; Vocational Training Center Literacy Laboratory, Fresno City College; Applied Mathematics Career Programs--a Curriculum Development Model, Los Medanos College; Auto Literacy Program, Yuba College; and College Skills for Health Occupations Students, Vocational Education Special Topics, and Functional Literacy, Santa Rosa Junior College. (KC)

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CALIFORNIA COMMUNITY COLLEGE HANDBOOK:

TEACHING BASIC SKILLS IN VOCATIONAL EDUCATION

MODEL PROGRAMS

Prepared for the Chancellor's Office,
California Community Colleges

by:

Evaluation and Training Institute
Los Angeles, California
1991

This project was supported by Vocational Education Act funds. The opinions expressed herein do not necessarily reflect the position or policy of the California Community Colleges, the Chancellor's Office, or the U.S. Department of Education, and no official endorsement should be inferred.

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Background

Across the nation, employers are becoming increasingly alarmed over the rapidly shrinking pool of qualified candidates for entry-level positions. With new technology and sophisticated job tasks, employers are in great need of entry-level employees who have mastered basic skills, and who can apply these skills to problem-solving and personal management. Essentially, employers need employees who "know how to learn" and can adapt to continually-changing systems.

The need to re-tool young adults with basic skills is supported by research which reports that almost 85 percent of academically disadvantaged young adults possess skill levels between the fourth and eighth grade level. Moreover, due to a complex mix of demographic and economic factors, demographers anticipate that the number of underprepared young adults who are seeking entry-level employment will continue to increase through the decade. [1] Labor leaders are looking to the local educational agencies for new ways to prepare a growing number of disadvantaged individuals to obtain the skills needed in today's work environment.

For the California Community Colleges, providing technical training to students who lack basic skills to succeed in vocational courses has proved to be challenging. Beginning in the 1960s, the open-door policy of the community colleges attracted a great number of students who lacked adequate preparation for college-level work. More recently, the influx of immigrant populations, disadvantaged, and minority students has added to the need for courses/programs that provide basic skills to students. Just as employers bemoan underprepared employees, the community colleges are seeing increasing numbers of underprepared students.

The implementation of state-mandated matriculation programs within the California Community Colleges documented for the first time the growing need for basic skill instruction, for both new and continuing students. According to the statewide evaluation of the Implementation of Matriculation in California, over one-half of the colleges expanded the number of basic

[1] Irwin Kirsch, and Ann Jungeblut. Literacy: Profiles of America's Young Adults. Final Report. Princeton, N.J. National Assessment of Education Progress (Educational Testing Service), 1986.

skills courses and sections of courses to meet the increased need for basic skills instruction. Moreover, over 56 percent reported that they were unable to serve all of the students who required remedial basic skill instruction.[2]

Although the need for basic skills instruction is evident, the most effective and time-efficient method for meeting the basic skill needs of vocational students is still under research.

Traditionally, basic skill instruction at the community colleges has largely been delivered through English and mathematics departments. Advocates of this delivery system assert that students will succeed in vocational programs at a higher rate if they are adequately prepared first through traditional academic "refresher", "remedial", or skill building courses, augmented through tutoring. A series of two or more basic skill courses taught by academic instructors may be needed to accomplish sufficient remediation or skill building in order to prepare students for the level of instruction they encounter in vocational instruction.

However, unlike students who plan to transfer to four year colleges and universities, vocational students, by definition, are interested in obtaining the education and occupational training they need as quickly as possible in order to obtain employment. Therefore, in response to employer demand for better-prepared vocational students and students' needs to receive vocational training relatively quickly, the colleges have begun to explore new delivery systems for basic skills instruction; namely, to integrate basic skills instruction into vocational programs so that students can enter employment with both a foundation of academic skills and the vocational job specific skills necessary to succeed in employment and life. Proponents of integrated instruction believe that students will succeed in vocational programs at a higher rate if they are allowed to learn in a practical setting, obtaining the needed "refresher", "remedial", or "skill building" instruction in a vocational context. Rather than defer vocational instruction until they have mastered basic academic concepts and skills, they will "learn by doing" through integrated curricula.

The Evaluation and Training Institute (ETI) was contracted by the Chancellor's Office to study the extent to which the community colleges have integrated basic skills instruction and vocational curricula, and to explore the methods by which the integration was formalized. In contrast to

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[2] Evaluation and Training Institute, "Evaluation of the Implementation of Matriculation," 1987- 1990, commissioned by the Chancellor's Office of the California Community Colleges.

an evaluation project or monitoring contract, this study was designed as a "fact finding mission" to explore the extent to which colleges have implemented integrated courses/programs. The primary objective of the study was to identify colleges which have developed model programs, and to provide recommendations for replication of such models either "as is" or with refinements. The project was conducted from November 1990 to June 1991.

Methodology

The intent of this project was to approach the study not as an evaluation or monitoring exercise, but rather as a fact-finding mission. The extent to which "models" existed for teaching basic skills in vocational education programs was an unknown variable from the outset of the study. Thus, the methodology for the study included the following activities:

* Identifying a project Advisory Committee to provide direction and feedback to the study;

* Conducting a literature review and search for curricular resources;

* Conducting a telephone survey of vocational/occupational deans, faculty and administrators;

* Conducting a series of 12 site visits;

* Compiling and synthesizing site visit findings, and developing recommendations for replication.

The remainder of this handbook is organized into the following sections:

- Steps for Integrating Basic Skills and Vocational Instruction;

- Profiles of model programs, including a brief overview, in-depth discussion, course outlines and excerpts from materials developed for the courses/programs;

- Bibliography of supporting/related resources; and

- An appendix which contains the site visit interview schedule and survey instrument.

Steps for Integrating Basic Skills in Vocational Education

The most salient finding from the telephone survey of vocational/occupational deans was that although college-level mathematics, reading and communication are included in vocational education course content, the majority of colleges had not developed a system for including **basic skills** in vocational courses. While interest in integrating basic skills in vocational education was high, the number of colleges which had invested resources in developing integrated courses were very few.

Those colleges which had worked to integrate basic skills with vocational education developed very unique approaches to meet the needs of their particular student population. The rationale for integrating basic skills and vocational instruction, the method of teaching, the format of the course, etc. all varied considerably and were designed for very specific student characteristics.

However, data collected from the site visits revealed several elements which were frequently included among, or were common across the models. These elements are presented in Table 1, at the conclusion of model profiles. The elements are presented under general headings, "program description", "development", "administration", and "funding."

Based on the findings from the study, the following "Steps for Integrating Basic Skills in Vocational Education" are recommended for community college staff interested in pursuing integration at their college. The steps are shown graphically in Figure 1.

Step 1: Obtain support from key administrators

Findings from ETI's statewide survey of colleges revealed that despite growing interest in integrating basic skills instruction in vocational education, integration is far from being universally accepted. Academic and vocational faculty alike voiced resistance to integration on the grounds that, at their colleges, basic skills are best taught in the academic departments, and that students are best prepared for vocational courses/programs if they have first mastered basic skills competencies in an academic setting. Therefore, **it is**

necessary to generate support for integration to lessen the probability that the project will fail due to philosophical barriers.

Each college should articulate specifically why integration of basic skills in vocational education is necessary for their particular student body. Citing matriculation assessment scores or other indicators that substantiate the need to offer basic skills instruction within a vocational context will support and give credibility to the integration effort. Moreover, the benefits of higher retention/persistence rates among students enrolled in vocational education and higher job placement rates should also be linked to integrating basic skills and vocational instruction.

Step 2: Determine comfortable processes for communication among academic and vocational faculty

> "Perhaps the most imperative **partnership** [for integration] is that between vocational and academic faculty."[3]

Effective communication among vocational and academic instructors is essential. Although effective communication is frequently recommended, the impact of effective communication is often the significant difference for model programs. Effective, frequent communication was most critical for colleges which relied heavily on the collaborative efforts of their vocational and academic faculty to develop course content and to determine performance objectives. According to the site visit interviews, without mechanisms to develop and continue effective communication among faculty, reviewing course materials, determining skill levels needed for vocational programs, and providing feedback on course content and syllabi can degenerate into turf battles. Site visit interviews also noted the importance of effective communication systems for providing feedback when course refinements are needed.

The crux of integration lies in the review of vocational and academic course content and the identification of specific competencies which will be covered in the integrated course/program. Six of the model programs highlighted in this report were developed through interaction between vocational and academic faculty. Establishing effective channels for

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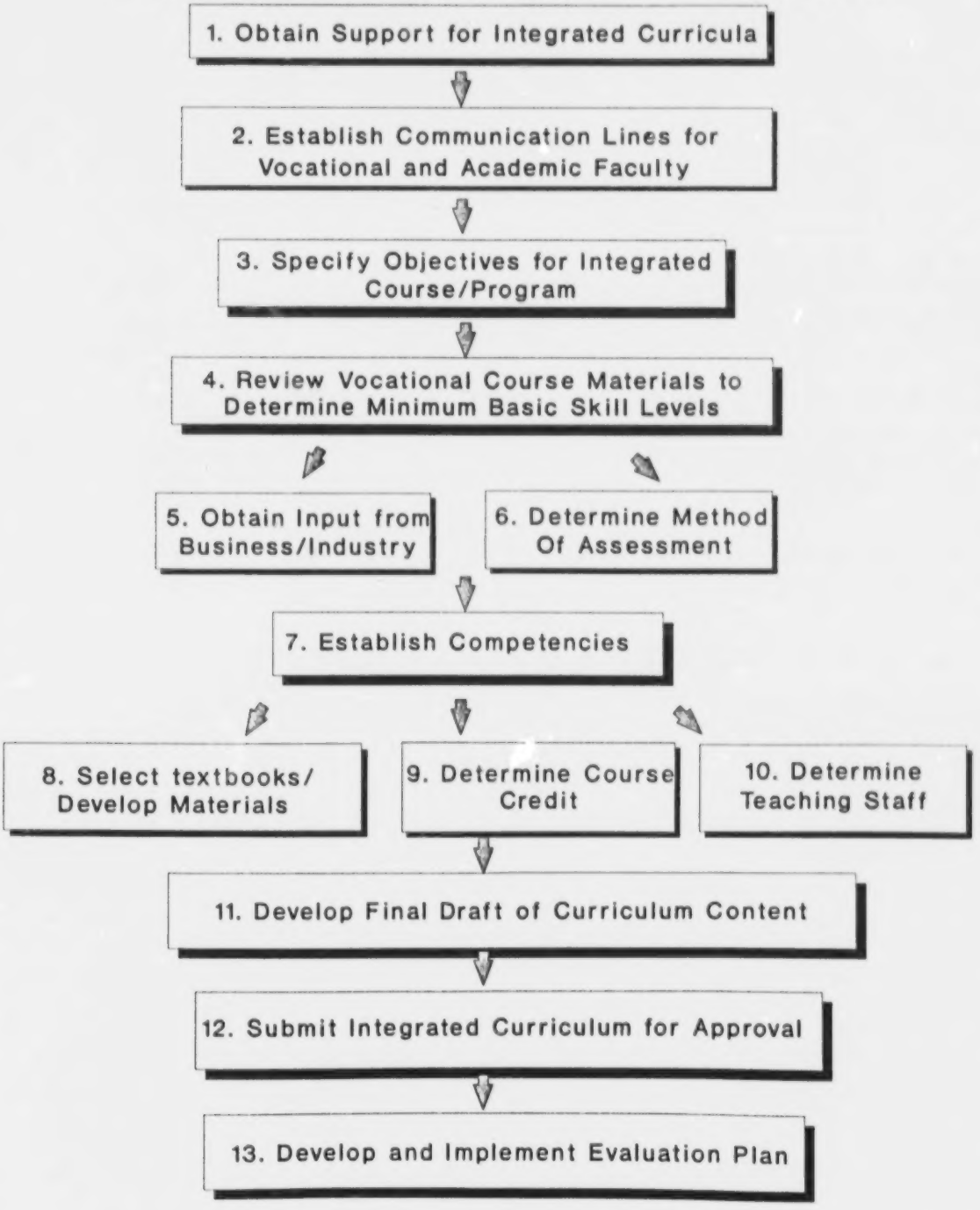
[3] Francis T. Tuttle, "Basic Skills: the New Bottom Line," in Vocational Education Journal, March 1988, p. 11.

Steps for Integrating Basic Skills and Vocational Instruction


1. Obtain Support for Integrated Curricula
2. Establish Communication Lines for Vocational and Academic Faculty
3. Specify Objectives for Integrated Course/Program
4. Review Vocational Course Materials to Determine Minimum Basic Skill Levels
5. Obtain Input from Business/Industry
6. Determine Method Of Assessment
7. Establish Competencies
8. Select textbooks/ Develop Materials
9. Determine Course Credit
10. Determine Teaching Staff
11. Develop Final Draft of Curriculum Content
12. Submit Integrated Curriculum for Approval
13. Develop and Implement Evaluation Plan

communication among these two groups is crucial to successfully integrating basic skills instruction in vocational education.

At Los Medanos College, the math and vocational faculty met several times to review the progress of the development of the Math 10 course -- at first formally and subsequently on an informal basis. San Joaquin Delta College developed a standing Basic Skills Committee to oversee the administration and refinement of the various basic skills courses offered at the college.

The level of formality for communication will vary from college to college. Smaller colleges tend to have more frequent contact among faculty members. At larger colleges **advisory committees** have been effective in fostering communication and overseeing the integration process.

A key to effective communication is to establish a safe, non-threatening environment for curricular review; an environment which allows for the exchange of information and ideas, rather than an evaluation of instructor teaching methods. Three of the model colleges reported that one way to develop an atmosphere of mutual respect and trust was to identify a project "director" who was highly regarded by both the academic and vocational faculty. As leader and -- at times -- moderator, each project "director" developed a positive working environment by affirming the best aspects of instructional methods and materials from both "sides of the house".

Step 3: Articulate objectives for integrating basic skills and vocational instruction

Once faculty and administrative support for integration has been obtained, step three will provide direction to the college's effort, and serve to keep all efforts "student-centered." Specific objectives for the integrated course/program should be determined at this phase. Because integration can take a variety of different forms, colleges need to determine the overall format and scope of their integration effort -- specifically, whether

* basic skills instruction will be integrated into one or more vocational areas,

* the integration will provide skills instruction in one, several, or all of the following areas: mathematical computations,

communication skills (reading, writing and oral communication), study skills, and job readiness;

* basic skills will be taught within a vocational course or as supplemental instruction;

* the course will fulfill certificate or AA degree requirements and/or transfer requirements; and

* the course will be taught by Academic or Vocational faculty.

Step 4: Determine Skill Levels Necessary to Succeed in Vocational Courses and Workplace

Although competencies for specific vocational tasks and concepts may be available, this study's findings indicate that in most cases, the basic skill levels needed for student success in vocational programs had neither been identified nor articulated.

Therefore, as a foundation for the development of the integrated courses/programs, the majority of model programs began with a review of vocational course textbooks and course materials to determine basic skill competency levels. These competencies then became the basis for the development of curricula, selection of textbooks, and development of additional instructional materials for the integrated courses/programs.

Several colleges, including Yuba College and MiraCosta College, utilized outside curriculum consultants and specialists to assist in the review of course materials, while other colleges conducted the review using academic faculty who specialize in mathematics and reading. In some cases, such as at Los Medanos College and San Joaquin Delta College, the results of the review of course texts and materials revealed similar basic skill competencies for several vocational areas. This led to the development of a "core" basic skills component applicable to a variety of vocational/technical fields.

In addition to using the curriculum consultants, MiraCosta College began the process of determining skill levels by using the Entry Standards Assessment (ESA) system, an established employer-approved competency list. MiraCosta College staff surveyed their vocational staff, reviewed their vocational materials, and then adapted ESA to better reflect the competencies required to succeed in their own vocational courses.

Because each college's vocational programs are specific and unique, each college must review its vocational program materials to identify mathematics, communication, and other skill levels necessary to succeed in its own program. Although existing taxonomies can be used as a foundation, they need to be revised in order to reflect what is taught within the vocational program at each particular college.

It is at this step that communication among vocational and academic faculty is critical. Those interviewed during the site visits commented that "turf" issues may develop if proper communication channels have not been previously determined, or if the parties involved have not been committed to an open environment to review courses. Each college operated very differently in regards to the curriculum review process: in six of the models, academic instructors took the lead in reviewing texts and identifying competencies. In only two cases did the vocational faculty conduct this review, using input from academic faculty for assistance.

Step 5: Include input from Vocational Advisory Committee and Business/Industry

Business and Industry are increasingly willing to provide input regarding the types of skills -- both technical and nontechnical -- entry-level workers must have to succeed in today's workplace. The Business and Industry representatives on vocational program advisory committees can be viable resources for reviewing course content, course competencies and performance objectives and ensuring that students are being prepared for the workplace. Fresno City College curriculum was developed in large part in conjunction with the Employers Training Resources (similar to the private industry council), business and industry input, and instructor design.

Step 6: Determine method for assessing student basic skills level

All students entering any vocational program should be tested to assess, at minimum, their skill abilities in reading comprehension, written expression, and mathematical computations. How students' skill levels are measured, the level at which "cut off" scores are set, and the extent to which assessment results are used to pinpoint areas of skill deficiency, and the extent to which scores are linked to specific skill building exercises/courses are questions which must be answered as part of the curriculum development process.

Although Matriculation assessments are now administered to an increasingly broad student population, the extent to which the results are utilized to identify student vocational skill needs was unclear. Matriculation scores were used as the primary vehicle to assess students' basic skills needs at Los Medanos College, Yuba College, and San Jose City College. In contrast, the integrated programs at Fresno City College, MiraCosta College, Bakersfield College, and Santa Rosa Junior College (Health Occupations programs) included assessment instruments developed specifically for the integrated program/course. The instruments were developed by staff who also were responsible for the development and/or delivery of the integrated curricula.

Of particular note is the work MiraCosta College has done in developing an assessment instrument for vocational students interested in receiving remediation and skill building work. Each skill tested by the instrument has been linked to a competency, which in turn is linked to specific exercises students conduct in the Workplace Learning Lab. An exhaustive taxonomy of skills, cross-referenced to competencies and lab exercises, has been developed to pinpoint specific areas where a student may need to hone their skills. In this way, remediation is more specific, and generally more time efficient for the student.

Assessment results for each of the programs highlighted in this handbook are used not only to determine areas in which students lack basic skills, but also as "baseline" measures, against which posttest assessment results were compared in order to determine student progress and skill achievement.

Cut-off scores for recommending students for integrated program/courses should be determined by a consensus of academic and vocational faculty. For colleges which use matriculation assessment results as the primary indicator for recommending basic skills instruction, these cut-off scores may suffice, but should be re-examined to ensure that the cut-off is pertinent to the skill needs of vocational students.

Step 7: Write competency statements and performance objectives for the integrated course/program

According to the California Code of Regulations (Administrative Code) Title V, competencies are:

> *"the prescribed performance level for skills, knowledge, and aptitude necessary to accomplish a job task."*

A common element among several models was the development of performance objectives. Frequently, competencies identified for reading, computations, and communication (written and oral) skills were expressed as performance objectives that defined what the student will be able to do, the conditions under which the student is expected to perform, and the criterion for level of performance.

In order to integrate basic skills into vocational education, the basic skills competencies needed to succeed in vocational education courses must be identified. To write strong competency statements, the following steps are recommended:

- Analyze technical textbooks and materials to determine competency levels needed to succeed in vocational courses.
- Clearly identify the skills to be mastered
- Specify conditions for demonstrating skill attainment
- Assign measurable standards for each skill
- Combine all elements into a concise, cohesive sentence.[4]

Among the models, competencies for academic basic skills courses and competencies for vocational education courses frequently were "meshed" in a functional context. Competencies identified for reading, computations, and communication skills were expressed as performance objectives for vocational tasks. Five of the colleges highlighted in this report translated the competency statements into performance objectives.

For example, the performance objectives for Yuba College's Basic Automotive Skills course include:

"*Students will be able to:*

* *Make a measurement using a micrometer, vernier caliper, or dial indicator or feeler gauge.*

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[4] See the Evaluation and Training Institute's, "Resource Guide of Competency Sources for Vocational Education Programs/Courses" scheduled to be disseminated before September 1991.

* *Convert a measurement from a fractional or decimal inch size to the equivalent metric size.*

* *Read a chapter of automotive text and construct an outline of that material."*

Performance objectives such as these highlight the vocational context of instruction, and ensure that the course maintains its vocational intent.

Step 8: Identify texts and/or need for supplementary materials

According to the site visit interviews, identifying textbooks or other instructional materials was closely linked to whether vocational or academic faculty were teaching the integrated course/program. At Bakersfield College, for example, where the vocational faculty were instructors of the Occupational Readiness course **and** the technical training courses, textbooks selected for use were vocational texts written to teach basic skills in an applied, functional approach. In contrast, at Los Medanos College, where Math 10 is taught by the mathematics faculty, the core component is based on mathematics texts. The texts are supplemented by lesson and test modules, written within a functional context. The modules of self-paced student assignments and tests were developed by the mathematics faculty to more effectively integrate vocational concepts with mathematics principals.

This study found that in all but selected cases, the model programs had developed their own materials to supplement the texts. Instructors frequently revealed a frustration with the lack of appropriate textbooks available for the integrated courses/programs. In order to effectively integrate vocational concepts, supplementary basic skills development materials, written in a **functional context** were used to bridge this gap.

> "Functional context learning is an approach to training in which instruction is taught contextually (in ways that reflect actual use on the job). It is designed to produce the quickest, most effective results in the area of improved employee performance." [5]

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[5] Anthony P. Carnevale, Leila J. Gainer, Ann S. Meltzer, Workplace Basics Training Manual, Jossey-Bass Publishers, San Francisco, 1990, p. 5.1.

At San Jose City College, the electronics instructor wrote her own textbook to adequately teach basic skills to electronics students. Other supplementary materials from the models included:

* Writing new software;
* Purchasing existing software and revising it to incorporate a vocational context;
* Developing self-paced lesson modules which emphasize particular technical tasks;
* Developing specialized testing instruments;
* Conducting role playing exercises for job readiness;
* Hands-on instruction in vocational laboratories;
* Developing vocabulary building exercises;
* Writing study skills exercises; and
* Identifying supplementary reading assignments

Determining the need for and the extent to which supplementary materials will be used at a college is extremely individualized from college to college. Excerpts from supplementary materials developed by the colleges highlighted in this report are evidence of the range of materials developed and used in instruction.

Although functional context learning has been applied to employer-based-training programs and on-the-job training, the same principles of training can be applied to the community college setting. The intent of functional context learning is to help students to more readily transfer knowledge (conceptual or skill-based) to their vocational programs and ultimately to their occupations. Frequently during site visit interviews, vocational faculty suggested that the integrated courses/programs could be strengthened if the course content used more "functional context learning" techniques, such as bringing in more measurement instruments or tools from the vocational labs, allowing students to use vocational labs for hands-on learning, etc.

Step 9: Finalize credit value of course/program

In keeping with Title V Regulations and individual college policies, the next step is to determine the credit value of the integrated course/program, and whether the credits earned will be applicable for transfer to four year colleges or universities. Fresno City College and MiraCosta College do not offer college credit for the integrated coursework completed by students, but rather offer the instruction as a supplement to vocational courses. Bakersfield College's JTPA program earns participants up to a maximum of 12 units of college credit. At San Joaquin Delta College, basic skills courses range from .5 to 3 units.

Step 10: Determine teaching staff for integrated curricula

This handbook includes examples in which academic faculty are the primary instructors as well as models where the vocational faculty are responsible for teaching the integrated curriculum. Findings from the site visit interviews indicate that courses/programs designed to provide basic skills in a vocational context rely on vocational instructors to assist in the learning process. "Vocational instructors must be a part of the learning process to keep the academic skill building classes on track with the vocational subject," commented a vocational dean. The extent to which vocational faculty are utilized to assist with basic skills instruction will greatly depend upon the extent to which the instruction relies on vocational concepts and applied functions.

Step 11: Prepare final drafts of curriculum

Final drafts of the integrated course/program curriculum should be prepared for review by curriculum committees, Business/Industry Advisory Committees, and other necessary parties. It is necessary to obtain approval from all academic and vocational faculty members and department heads who have been involved in the development of the course/program.

Step 12: Submit integrated course/program for final approval

The curriculum approval process for each college is also highly individualized. Course outlines routinely are reviewed by department chairs, curriculum committees, instructional councils. Depending upon the credit value of the proposed course/program, approval may also include review by boards of trustees.

Step 13: Develop evaluation procedures

Among the colleges which had "model" integrated courses/programs, there existed a significant lack of evaluative information on the impact of the integrated course in meeting students' basic skill needs. The most comprehensive/formal evaluations had been conducted by Private Industry Councils as part of JTPA training. These evaluations provided highly informative evaluation information which gave strong rationale for continuing integration efforts. San Joaquin Delta College also included an evaluation component, and utilized a third-party evaluator to measure skills improvements, the effects of the basic skills instruction on student performance, retention rates, self confidence, as well as other variables (see profile of the "Communications Skills Division -- Basic Skills Program"). An evaluation of this caliber validates the effects of the college's efforts in improving student basic skills.

Conducting on-going evaluations will allow for course revision or updating, necessary to respond to the changing needs of students and industry. It is strongly recommended that colleges interested in developing integrated courses/programs develop a process for evaluating the course on two levels:

1) Evaluate instructor teaching strategies, appropriateness of texts, and curriculum concepts; and

2) Evaluate student outcomes

Outcomes should be documented to determine the extent to which the course curriculum is successful in upgrading students' basic skill levels, and increasing student enrollment and persistence in vocational courses/programs. Evaluation data can also be used to gain support among key administrators and decision-makers for maintaining integrated courses/programs and/or creating new integrated courses/programs.

The steps detailed above provide general parameters regarding the process, but do not dictate the extent to which individual instructors, district personnel or board members will be involved. These decisions should be made at the local level, to ensure ownership of the integration process and of the final curriculum.

Matrix of Model Programs

MATRIX OF MODEL PROGRAMS/COURSES FOR INTEGRATING BASIC SKILLS INSTRUCTION IN VOCATIONAL EDUCATION

	Bakersfield College	*Fresno City College*	*Los Medanos College*	*Miracosta College*	*San Joaquin Delta College*	*San Jose City College*	*Santa Rosa Jr. College*	*Yuba College*
Description of Course/Program								
General training applicable to a variety of vocational areas		●	●		●	●		
Specific training for one or more vocational area	●		●	●			●	●
Taught by Vocational Faculty	●					●		●
Taught by Academic Faculty		●	●	●	●		●	●
Includes Math Skill instruction	●	●	●	●	●	●	●	
Includes Verbal/Communication skill instruction	●	●		●	●	●	●	●
Includes Job Readiness instruction	●			●	●			
Includes Study Skills	●		●	●	●		●	●
Use of Pre-determined "competencies"		●	●	●	●	●		●
Based on "Performance Objectives"	●		●	●		●		●
Number of Units earned	varies	0	3	0	varies	2	3	3
Use of Peer Tutors			●		●			

MATRIX OF MODEL PROGRAMS/COURSES FOR INTEGRATING BASIC SKILLS INSTRUCTION IN VOCATIONAL EDUCATION

	Bakersfield College	*Fresno City College*	*Los Medanos College*	*Miracosta College*	*San Joaquin Delta College*	*San Jose City College*	*Santa Rosa Jr. College*	*Yuba College*
Use of computer-based learning				●	●	●	●	
Counseling component	●				●			
Informal counseling component				●			●	●
Self-paced instruction			●	●	●			
Development:								
Developed via interaction between Vocational and Academic Faculty		●	●	●	●		●	●
Review of Vocational Materials to determine Basic Skills competencies necessary to succeed in vocational programs	●	●	●	●	●	●	●	
Analysis of skill levels needed to perform vocational tasks conducted	●	●		●	●	●		●
On-going course/program refinement	●	●	●	●	●	●	●	●
Special Materials developed for instruction	●	●	●	●	●	●	●	●
Academic instructors obtain course and other information from vocational instructors		●	●	●	●		●	●
Vocational instructors obtain course and other information from academic instructors				●	●			●

MATRIX OF MODEL PROGRAMS/COURSES FOR INTEGRATING BASIC SKILLS INSTRUCTION IN VOCATIONAL EDUCATION

	Bakers-field College	*Fresno City College*	*Los Medanos College*	*Miracosta College*	*San Joaquin Delta College*	*San Jose City College*	*Santa Rosa Jr. College*	*Yuba College*
Administration:								
Mechanism exists for on-going communication among faculty	●	●	●	●	●	●	●	●
Mechanism exists for on-going refinement	●	●	●	●	●	●		●
System exists for evaluating program effectiveness	●		●		●			●
Funding:								
Developed through special grant funding	●	●	●	●			●	●
Developed through college general funds					●		●	
Maintained through special grant funding	●	●		●				
Maintained through college general funds			●		●	●	●	●

Model Profiles

The following section presents the profiles of model courses/ programs for integrating basic skills instruction in vocational education. These profiles present research team findings and provide a discussion of the unique characteristics of each course/program. Available course outlines, and excerpts from materials developed for the specific courses are also included.

Workplace Learning Lab

MiraCosta College

Background:

In 1986, MiraCosta modified their approach to providing basic skills remediation in conjunction with their Job Training Partnership Act (JTPA) programs. The basic skills curricula for the JTPA training was developed using competencies identified by the Entry Standards Assessment (ESA) System, developed by San Mateo county CETA Staff Development Project. The ESA system identifies employer validated basic skills competencies in thirty-three occupational areas. These competencies served as the foundation for the initial JTPA basic skills training component at MiraCosta College.

In 1988, a small computer lab was established to expand the delivery of basic skills instruction on an individual basis to JTPA participants. The lab focused on measured skill deficiencies in basic skills (reading, writing, and computation) required for entry level employment. At this time, a process was developed for analyzing training and/or job requirements in order to upgrade the existing competencies of the ESA System and to establish new competencies for additional occupations.

In 1989, vocational skills training instructors were surveyed to determine their perception of the basic skill competencies required for successful completion of their credit courses. This survey identified basic skills competencies specific to MiraCosta courses in the training areas of Business, Horticulture, Machine Shop, Auto Mechanics, Auto Body, Vocational Nursing, Retailing, Hotel Industry, Cosmetology, Child Development, Drafting, and Bookkeeping. Detailed taxonomy charts of each individual skill were developed, and then linked to specific skill building exercises that students performed in the lab.

Additionally, the lab was expanded to serve students enrolled in all vocational education classes offered at the college, not only JTPA students. The instructors were encouraged to refer any student with skill deficiencies to the Workplace Learning Lab for remediation.

Purpose:

The basic skills taught in the Workplace Learning Lab are not "prerequisites" for training, but rather skills that can be mastered concurrently with training. The skills remediation curricula is adapted from various levels of traditional instructional materials and are essential to participation in a training program and/or performance in a job. The purpose of the Workplace Learning Lab was three-fold:

- To identify basic skills necessary for employment and specific training areas;
- To develop competencies for vocational education classes; and
- To serve those vocational students exhibiting deficiencies in basic skills.

Description of Program:

The Workplace Learning Lab utilizes a customized instructional approach as an alternative for students who do not perform well in traditional vocational classroom settings. Integration is achieved through a competency-based "functional" context, rather than through the traditional academic approach.

Basic skills training is matched to individual learning styles, rates of learning, attention spans, and comfort zones of students through several teaching approaches: individualized tutoring, small group instruction, computer aided instruction, interactive video, text assignments, and personalized data bases used with existing computer software. Software applications include remediation exercises such as basic computations and technical vocabulary lists. The program is very flexible in terms of both content and method of delivery. Students who are referred to the lab by their vocational instructors use the lab's services on a voluntary basis.

Initially, the lab staff assesses the student's work interests and educational background, and helps him/her establish long and short-term goals. The staff then administers a pretest to determine the student's skills level. The pretest covers current reading and math levels and also skills required for the desired vocation/occupation. An assessment of the test results identifies specific skills deficiencies. A certificated instructor, trained in this approach,

determines the learning style that best fits the learning style of the student and formulates a competency-based remediation plan with the student. Upon completion of the remediation, a posttest is given to ensure that the targeted skill deficiency has been corrected. Performance in vocational training and instructor feedback provide ongoing input to the remediation process.

The students receive no credit for attending the workplace literacy lab; however, vocational instructors report that many of the students are in danger of dropping out, and the lab provides the remediation and motivation necessary for completion of training and eventual employment.

Development:

The JTPA staff have continually updated and expanded the program to better meet the basic skills requirements of training and employment. By effectively communicating with the vocational education faculty to pinpoint specific skill requirements, a detailed competency taxonomy was developed. Also, the support of the college administration helped in the success of the lab. The President of MiraCosta College has expressed a commitment to meeting the needs of the business community. The business community is represented by Industry Advisory Boards for vocational programs who are encouraged to visit the lab and provide their input. Also, individual employers give feedback regarding the individual JTPA placements.

During the Spring of 1991, basic skills competencies were formalized in the areas of clerical, certified nurses' aide, and the machine tool programs. Assessment information was obtained from a current literature review, interviews with instructors and employers, and a validated task listing from the Western Curriculum Coordination Center (WCCC). The WCCC task list identifies the literacy required with a specific task. A private consultant was hired to develop lab remediation curricula for these new programs. Vocational skills instructors provide input in this process and will review the new curricula for approval.

Funding:

Original development funds came from JTPA. JTPA continues to fund all staffing costs associated with the certificated lab instructors. Some of the equipment and staff time for curricular development was funded by Carl Perkins/VEA. The college itself donated $30,000 of essential equipment and furniture to establish the computer lab.

Recommendations for Replication:

The first priority is to meet the needs of vocational students. This, in turn helps ensure that the needs of the business community will be met. Communication and involvement at all levels provides valuable input and feedback. This includes administrators, faculty, staff, employees, and students. We found the use of task lists to identify skill levels and the circulation of draft competencies were helpful planning strategies. It is necessary for all colleges to develop competencies specific to their own course requirements. Networking with others and sharing information to better understand the process help, but the final competencies must be developed in-house. As a final note, experience has been our best teacher, so begin at any level you can. Do what works for you. Building on this by applying the principles of continuous process improvement (CPI) will, with certainty, produce the results you desire. Also, put everything in a computer system, change is constant.

Evidence of Effectiveness or Input:

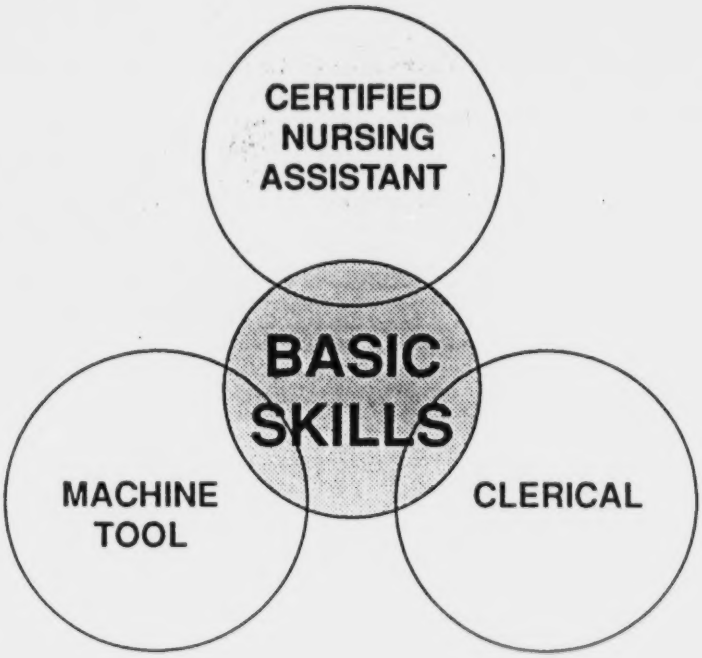
The JTPA staff have noted that participants have a more positive attitude toward learning and increased motivation. The students formulate goals for themselves and overcome skill deficiencies. In this way, many students have been able to complete their training and gain access to higher paying jobs. Retention rates in vocational courses has increased as noted by vocational course instructors who have stated that many of these students never could have passed without the lab remediation. The computer lab served over 200 students at some level of service in the 1990-91 academic year. Over 100 of those students received specific skill remediation. Pilot implementation of the clerical, CNA, and Machine Tool basic skills curricula is scheduled for Fall of 1991, including a more formal evaluation of effectiveness for improved retention in training, placement into employment, and retention after placement.

Contact:

Dennis Ely
(619) 757-2121

Sample Materials:
MiraCosta College

INTEGRATION OF BASIC SKILLS INTO VOCATIONAL COURSES AT MIRACOSTA COLLEGE



A PRELIMINARY STUDY BY THE WORKPLACE LEARNING LAB JUNE 1991

INTRODUCTION AND RECOMMENDATIONS

Soon after beginning the operation of contracted employment programs by MiraCosta College in 1985, it became apparent to program staff that many applicants did not possess levels of basic educational skill which would insure their successful completion of training and entry into employment. Moreover, the incidence was sufficiently generalized in terms of populations, that we concluded the problem was significant and widespread. Our conclusion has been supported by a statewide evaluation of matriculation programs.

The implementation of state-mandated Matriculation programs within the California Community Colleges documented for the first time the growing need for basic skill instruction, for both new and continuing students. According to the statewide evaluation of the Implementation of Matriculation in California, over one-half of the colleges expanded the number of basic skills courses and sections of courses to meet the increased need for basic skills instruction. Moreover, over 56 percent reported that they were unable to serve all of the students who required remedial basic skill instruction.[1]

This evaluation did not specifically focus on vocational students. If much needed institutional research were done in this area, I believe the percentage would be even higher for vocational students, many of whom represent "disadvantaged" populations.

The research (and/or debate) continues on what type of approach would best prepare students for vocational training. One approach emphasizes preparation through traditional academic skill building courses prior to enrollment in vocational training. The other approach provides for integration of basic skills with vocational training in a more functional context.

Our experience indicates that there is a significant number of potential students, particularly among disadvantaged populations, who lack the motivation and/or financial resources to pursue the more traditional approach. They want an alternative. They are interested in obtaining the basic education and vocational training they need as quickly as possible in order to secure employment. It is more a matter of survival than preference. Once their life has somewhat stabilized, they may always return to more traditional approaches for further education. Employers, desperate for qualified entry-level workers are practically demanding a different response from education. Various federal, state and local entities, motivated by the desire to reduce the growing number of public assistance recipients, also support an alternative approach.

As a result of responding to these needs in our employment training programs, MiraCosta College currently has the capability to offer this alternative to appropriate students. This manual represents our first effort to formally document our approach to the integration of basic skills with vocational training. We offer this not as a final definitive study, but simply as a first effort. Acknowledging that we know only a little, we hope this manual serves to encourage the further effort needed to determine the value of an alternative. In this light we offer the following recommendations:

---

[1] Evaluation and Training Institute, "Evaluation of the Implementation of Matriculation," 1987-1990, commissioned by the Chancellor's Office of the California Community Colleges.

1) That these curricula be formally field tested and evaluated for effectiveness (quantitative and qualitative measures).

2) That the relationship be studied between this approach and other existing academic courses or approaches of the College, e.g. ABE, GED, tutoring, college preparatory classes, etc.

3) That priorities be established for the development of additional curricula for the remaining vocational courses.

4) That the process for developing this type of curriculum be further documented for replication by other colleges.

5) That a somewhat broader basic skills curriculum be developed addressing more generic world of work requirements for potential integration with work experience and other vocational courses.

6) That institutional research be conducted regarding the characteristics and needs of vocational students as opposed to other student groups.

7) That financial and human resources be committed which will support the effort necessary to accomplish the other stated recommendations.

Several individuals have been highly instrumental in the task of producing these materials. I would like to acknowledge their generous contribution of time and expertise here:.

Bruce Stewart
Dean, Vocational Education
and Applied Sciences

Bob Smith
Instructor
Machine Tool Technology

Emily Hanson
Basic Skills Instructor
Contracted Employment Training

Cleda Kellogg
Instructor
Certified Nursing Assistant

Roberta Wiersma
Basic Skills Instructor
Contracted Employment Training

Claude Sweet
Director Computer Mentor Project

I would also like to thank all the other vocational faculty and staff for their support and assistance.

Submitted by:

Dennis W. Ely
Administrator, Contracted Employment Training
June 1991

MACHINE TOOL SKILL ANALYSIS

1. Calculate

1.1. Compute whole number word problems

1.1.1. Add three digit numbers

1.1.1.1.Add two or more single digit numbers

1.1.1.1.1.Add two single digit whole numbers less than six

1.1.1.1.2.Add two whole numbers less than ten.

1.1.1.2.Add two or more two digit numbers

1.1.1.2.1.Add two whole numbers less than one hundred

1.1.1.3.Add two or more three digit numbers

1.1.1.3.1.Add two whole numbers less than one thousand

1.1.1.3.2.Add ten 3 digit numbers in a column

1.1.2. Subtract three digit numbers

1.1.2.1.Subtract single digit numbers

1.1.2.1.1.Subtract two single digit whole numbers less than six

1.1.2.1.2.Subtract two whole numbers less than ten

1.1.2.1.3.Subtract two whole numbers less than ten

1.1.2.2.Subtract two digit numbers

1.1.2.2.1.Subtract two whole numbers one single digit number and one double digit number

1.1.2.2.2.Subtract two two digit whole numbers

1.1.2.3.Subtract three digit numbers

1.1.2.3.1.Subtract one two digit number from a three digit number

1.1.2.3.2.Subtract one three digit number from another three digit number

1.1.2.3.3. Subtract one three digit number from another three digit number

1.1.3. Multiply 3 digit numbers

1.1.3.1.Multiply two single digit numbers

1.1.3.1.1.Multiply two numbers, less than six

1.1.3.1.2.Multiply two numbers between five and nine

1.1.3.1.3.Multiply two numbers less than ten

1.1.3.1.4.Square a number less than ten

1.1.3.2.Multiply two two digit numbers

1.1.3.2.1.Multiply one two digit number and one one digit number

1.1.3.2.2.Multiply two two digit numbers

1.1.3.3.Multiply two three digit numbers

1.1.3.3.1.Multiply one three digit number and one one digit number

1.1.3.3.2.Multiply one three digit number and one two digit number

1.6.6.3.Convert a scale drawing into the actual size
1.6.6.4.Identify a blueprint
1.6.7. Read a graph or chart
1.6.7.1.Locate the point
1.6.7.2.Choose the correct part
1.6.7.3.Identify the parts
1.6.8. Read a ruler
1.6.9. Use a calculator
1.6.10.Measure from a scale drawing
1.6.11.Calculate the dimensions of an object
1.6.12.Read an analog clock.
1.6.12.1.Identify the parts on an analog clock
1.6.12.2.State the time
1.6.12.3.Record the time
1.6.13.Read a digital clock
1.6.13.1.State the time
1.6.13.2.Record and measure task time
1.6.13.3.Add time
1.6.13.4.Multiply time
1.6.13.5.Calculate salary

2. Read.

2.1. Read the numbers between zero and one hundred
2.2. Identify task related vocabulary
2.3. Define the task related words
2.4. Read task related terms
2.5. Read task related forms
2.6. Identify key information on a chart or form
2.7. Read and write answers to questions based on key information on a chart or form
2.8 Answer the "who, what, where and when" questions based on factual information from an article

3. Write.

3.1. Complete task related forms
3.1.1. Write a given money value
3.1.2. Spell task related terms
3.1.3. Write task related phrases appropriately

4. Listen

4.1. Write down the exact words of a short oral message
4.2. Listen and perform a related task
4.3. Listen and perform a multi-stepped task
4.4. Write down the main ideas of a speaker
4.5. Write notes on facts given by a speaker
4.6. Record oral information on the appropriate task related form

5. Speak

5.1. Read and use task related terms in a sentence
5.2. State the main ideas in a given paragraph
5.3 Answer "who,what, where, and when" questions based on given information

MACHINE TOOL BASIC SKILLS TAXONOMY

1. The Learner Will Be Able To (LWBAT) calculate.

1.1. The LWBAT compute whole number word problems.

1.1.1. The LWBAT add three digit numbers

1.1.1.1. The LWBAT add two or more single digit numbers.

1.1.1.1.1. Given two single digit whole numbers less than six, the LWBAT add them together

1.1.1.1.2. Given two whole numbers less than ten, the LWBAT add them together.

1.1.1.2. The LWBAT add two or more two digit numbers.

1.1.1.2.1. Given two whole numbers less than one hundred, the LWBAT add them.

1.1.1.3. The LWBAT add two or more three digit numbers.

1.1.1.3.1. Given two whole numbers less than one thousand, the LWBAT add them together.

1.1.1.3.2. Given ten 3 digit numbers in a column, the LWBAT add them together.

1.1.2. The LWBAT subtract three digit numbers.

1.1.2.1. The LWBAT subtract single digit numbers.

1.1.2.1.1. Given two single digit whole numbers less than six, the LWBAT subtract them.

1.1.2.1.2. Given two whole numbers less than ten, the LWBAT subtract them.

1.1.2.1.3. Given two whole numbers less than ten, the LWBAT subtract them.

1.1.2.2. The LWBAT subtract two digit numbers.

1.1.2.2.1. Given two whole numbers one single digit number and one double digit number, the LWBAT subtract the one digit number from the two digit number.

1.1.2.2.2. Given two two digit whole numbers, the LWBAT subtract one two digit number from the other number.

1.1.2.3. The LWBAT subtract three digit numbers.

1.1.2.3.1. Given one two digit whole number and one three digit number, the LWBAT subtract one two digit number from the three digit number.

1.1.2.3.2. Given two three digit whole numbers, the LWBAT subtract one three digit number from the other three digit number.

1.1.2.3.3. Given two three digit numbers, the LWBAT subtract the smaller three digit number from the larger three digit number.

1.1.3. The LWBAT multiply 3 digit numbers.

1.1.3.1. The LWBAT multiply two single digit numbers.
1.1.3.1.1. Given two numbers, less than six, the LWBAT compute the product.
1.1.3.1.2. Given two numbers between five and nine, the LWBAT compute the product.
1.1.3.1.3. Given two numbers less than ten, the LWBAT compute the product.
1.1.3.1.4. Given a number less than ten, the LWBAT square that number.
1.1.3.2. The LWBAT multiply two two digit numbers.
1.1.3.2.1. Given one two digit number and one one digit number, the LWBAT compute the product.
1.1.3.2.2. Given two two digit numbers, the LWBAT compute the product
1.1.3.3. The LWBAT multiply two three digit numbers.
1.1.3.3.1. Given one three digit number and one one digit number, the LWBAT compute the product.
1.1.3.3.2. Given one three digit number and one two digit number, the LWBAT compute the product.
1.1.3.3.3. Given one three digit number and one two digit number, the LWBAT compute the product.
1.1.3.3.4. Given two three digit numbers, the LWBAT compute the product.
1.1.4. The LWBAT divide a three digit divisor into a multiple digit dividend.
1.1.4.1. The LWBAT divide a one digit divisor into a multiple digit dividend.
1.1.4.1.1. Given a one digit divisor, the LWBAT divide it into a one digit dividend.
1.1.4.1.2. Given a one digit divisor, the LWBAT divide it into a two digit dividend.
1.1.4.1.3. Given a one digit divisor, the LWBAT divide it into a three digit dividend.
1.1.4.1.4. Given a one digit divisor, the LWBAT divide it into a three digit dividend with remainder
1.1.4.1.5. Given a a one digit divisor, the LWBAT divide it into a four digit dividend.
1.1.4.1.6. Given a a one digit divisor, the LWBAT divide it into a four digit dividend with remainder.
1.1.4.2. The LWBAT divide a two digit divisor into a multiple digit dividend.
1.1.4.2.1. Given a two digit divisor, the LWBAT divide it into a three digit dividend.

MACHINE TOOL OBJECTIVE/RESOURCE CHART

OBJECTIVE		RESOURCE(S)
1.	**The Learner Will Be Able To (LWBAT) calculate.**	
1.1.	**The LWBAT compute whole number word problems.**	**CNP#1,p.1-18; MBM**
1.1.1.	The LWBAT add three digit numbers	CNP#1, p. 1-18; MB
1.1.1.1.	The LWBAT add two or more single digit numbers.	CNP#1, p. 1-18; EABM-Easy; MB; MS
1.1.1.1.1.	Given two single digit whole numbers less than six, the LWBAT add them together.	CNP#1, p. 1-18; EABM-Easy; MB; MS; SD.V.3 O#26
1.1.1.1.2.	Given two whole numbers less than ten, the LWBAT add them together	CNP#1, p. 1-18; EABM-Easy; MB; MS; SD.V.3 O#27
1.1.1.2.	The LWBAT add two or more two digit numbers.	CNP#1, p. 1-18; EABM-easy; MB;
1.1.1.2.1.	Given two whole numbers less than one hundred, the LWBAT add them.	CNP#1, p. 1-18; EABM-easy; MB; SD.V.3 O#28
1.1.1.3.	The LWBAT add two or more three digit numbers.	CNP#1, p. 1-18; EABM-med.; MB
1.1.1.3.1.	Given two whole numbers less than one thousand, the LWBAT add them together.	CNP#1, p. 1-18; EABM-med.; MB; SD.V.3.O#29
1.1.1.3.2.	Given ten 3 digit numbers in a column, the LWBAT add them together.	CNP#1, p. 1-18; EABM-med.; MB
1.1.2.	The LWBAT subtract three digit numbers.	CNP#1, p. 20-41; EABM-med.; MB
1.1.2.1.	The LWBAT subtract single digit numbers.	CNP#1, p. 20-41; EABM-Easy; MB; MS
1.1.2.1.1.	Given two single digit whole numbers less than six, the LWBAT subtract them.	CNP#1, p. 20-41; EABM-Easy; MB; MS SD.V.4 O#36

MACHINE TOOL OBJECTIVE/RESOURCE CHART

OBJECTIVE		RESOURCE(S)
1.1.2.1.2.	Given two whole numbers less than ten, the LWBAT subtract them.	CNP#1, p. 20-41; EABM-Easy; MB; MS
1.1.2.1.3.	Given two whole numbers less than ten, the LWBAT subtract them.	CNP#1, p. 20-41; EABM-Easy; MB; MS; SD.V.4 O#37
1.1.2.2.	The LWBAT subtract two digit numbers.	CNP#1, p. 20-41; EABM-easy; MB
1.1.2.2.1.	Given two whole numbers one single digit number and one double digit number, the LWBAT subtract the one digit number from the two digit number.	CNP#1, p. 20-41; EABM-easy; MB; SD.V.4 O#38
1.1.2.2.2.	Given two two digit whole numbers, the LWBAT subtract one two digit number from the other number.	CNP#1, p. 20-41; EABM-easy; MB; SD.V.4 O#40
1.1.2.3.	The LWBAT subtract three digit numbers.	CNP#1, p. 20-41; EABM-easy; MB
1.1.2.3.1.	Given one two digit whole number and one three digit number, the LWBAT subtract one two digit number from the three digit number.	CNP#1, p. 20-41; EABM-easy; MB; SD.V.5 O#42
1.1.2.3.2.	Given two three digit whole numbers, the LWBAT subtract one three digit number from the other three digit number.	CNP#1, p. 20-41; EABM-easy; MB; SD.V.5 O#44
1.1.2.3.3.	Given two three digit numbers, the LWBAT subtract the smaller three digit number from the larger three digit number.	CNP#1, p. 20-41; EABM-easy; MB; SD.V.5 O#45
1.1.3.	The LWBAT multiply 3 digit numbers.	CNP#1, p. 43-66; MB
1.1.3.1.	The LWBAT multiply two single digit numbers.	CNP#1, p. 43-66; MB; MF; MS

MACHINE TOOL TECHNOLOGY

BASIC TOOL IDENTIFICATION LIST

OUTSIDE MICROMETER

THREAD MICROMETER

DIAL TEST INDICATOR

SMALL HOLE GAGE

SURFACE GAGE

SQUARE HEAD

PROTRACTOR HEAD

TAP HANDLE

HEIGHT GAGE

WIGGLER SET

DIVIDERS

INSIDE SPRING CALIPERS

PRICK PUNCH

GRANITE SURFACE PLATE

"C" CLAMP

COUNTERBORE

"V" BLOCKS

COLLET

DEAD (SOLID) CENTER

LATHE DOG

GUN TAP

"T" NUT

MULTI-FLUTE END MILL

R-8 TAPER

#40 STANDARD MILLIMG MACHINE TAPER

#50 STANDARD MILLING MACHINE TAPER

DEPTH MICROMETER

DISK MICROMETER

VERNIER CALIPER

TELESCOPE GAGE

COMBINATION SET

CENTER HEAD

6" & 12" RULE

HERMAPHRODITE CALIPERS

EDGEFINDER

THREAD CENTER GAGE

OUTSIDE SPRING CALIPERS

CENTER PUNCH

SCRIBER

PARALLEL BARS

COUNTERSINK

CENTER DRILL

ANGLE PLATE

LIVE (BEARING) CENTER

CARRIAGE STOP

TAP SET

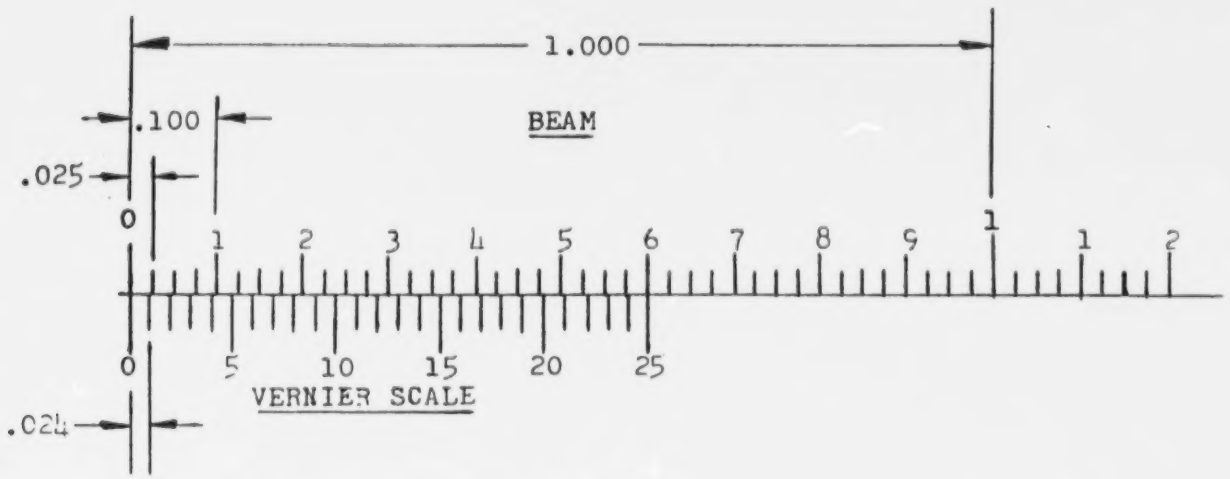
"I" BOLT

2 FLUTE END MILL

MORSE TAPER

SC TAPER

MACHINIST CLAMP (PARALLEL CLAMP)



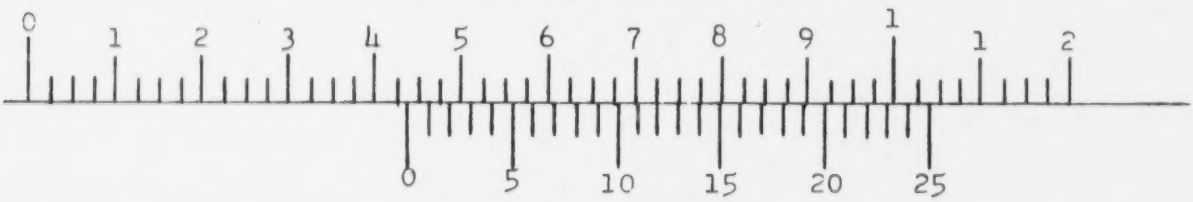
What do all those lines mean

Each numbered line on the BEAM represents a movement of .100 of an inch.

Each short line between the numbered lines represents a movement of .025 of an inch.

The position of the zero line on the VERNIER SCALE in relation to the graduations on the BEAM indicate the reading.

In the enlarged diagram of the scales shown above, the zero line of the VERNIER SCALE coincides with the zero line on the BEAM. Therefore, the reading is zero, indicating no movement; the jaws of the caliper would be closed at this reading.



As the caliper jaws open, the Vernier Scale moves a corresponding distance to the right, increasing the indicated reading on the Beam.

In the diagram above, the Vernier Scale has moved to the right so that the zero line is past the .400 line on the Beam. It is also past the .025 line, but not to the .050 line. Therefore, the reading will be somewhere between .425 and .450.

Exactly how much more than .425 is indicated by which line on the Vernier Scale corresponds with one of the lines on the Beam; In the above diagram, the number 12 line. Therefore, .012 is added to the .425 reading, giving a total reading of .437.

ENTRY STANDARDS ASSESSMENT (E.S.A.)

for

SAN MATEO ADULT SCHOOL CLERICAL TRAINING*

Check The Items You Can Do

1. Some office workers must be able to maintain simple budget records. To demonstrate the ability to perform this task, solve the following additions:

(a)
$$\begin{array}{r} \$20.85 \\ 14.95 \\ 6.75 \\ +\ 2.55 \end{array}$$

(b)
$$\begin{array}{r} \$149.95 \\ 57.65 \\ 20.50 \\ 89.88 \\ +\ 17.49 \end{array}$$

3E.3

2. Office workers must be able to keep track of expenditures for requisitions and petty cash. To demonstrate the ability to perform this task, do the following subtraction problems:

(a)
$$\begin{array}{r} \$25.00 \\ -\ 6.75 \end{array}$$

(b)
$$\begin{array}{r} \$487.16 \\ -\ 29.87 \end{array}$$

3E.4

3. Most workers must be able to calculate the cost of supplies needed. To demonstrate the ability to perform this task, perform the following multiplication problems:

(a)
$$\begin{array}{r} \$16.95 \\ \times\ 25 \end{array}$$

(b)
$$\begin{array}{r} \$80.25 \\ \times\ 18 \end{array}$$

3E.5

4. If a man earns $6.275 per hour, find his total take-home pay if he works 8 hours on Monday through Thursday and 7.5 hours on Friday and his total deductions are $50.63.

3F.1

*Standards stipulated by classroom instructor
Developed by Vocational Education Special Projects
9/82

Check The Items You Can Do

11. Clerical jobs require that you follow written instructions.

Read the instructions below and answer the following questions:

17A.5

A letter must be carefully proofread before it is removed from the typewriter. Just be sure that you acquire this necessary habit. Here is an idea of some of the steps to follow:
First, check the placement and the form of the letter. It should be well-placed on the page, and it should look much like a picture in a frame. Every key stroke should be even or uniform.
Second, be sure that all figures and amounts are exact. Be sure to see that the address is correct.
Lastly, verify the content of the letter; also the grammar and spelling. Be sure that all typing errors have been neatly corrected, and that there are no errors of word division, and the like.

(a) When should a letter be proofread?

_____

(b) What should a well-placed letter look like?

_____

(c) Must you check grammar and spelling?

_____

Check The Items You Can Do

14. Check the groups of words which are NOT complete sentences. _____

_____ Office workers enjoy busy, exciting careers. 22C.1

_____ The more rewarding the job.

_____ Her machine at the end of the period.

_____ Bill placed the paper in the machine.

_____ Al, a clever repairman, and his tools.

_____ Lola covered her machine at the end of the period.

15. Underline the correct word in parenthesis: _____

(a) Neither of the men (is, are) working. 22C.25d

(b) There (was, were) five books on the shelf.

(c) (Don't, Doesn't) he know how to do it?

(d) A group of girls, including my sister, (is, are) going to Europe this summer.

16. Add punctuation as needed to the following sentences: _____

(a) Vera my best friend lives in San Jose 22C.35

(b) Johns dog chased its tail 22C.38

(c) I enjoyed reading the book didnt you 22C.42

(d) Bill tried hard however he finally had to give up 22C.34

OCCUPATIONAL DATA TRAINING

Activities Checklist

NAME_____DATE_____

See Counseling Notes and Time Sheet for actual hours spent on each activity.

PRELIMINARIES:

- ☐ Reading test
- ☐ Math test
- ☐ Interview
- ☐ Job-specific test_____
- GED Pre-tests (5) ☐ ☐ ☐ ☐ ☐

COMPUTER LITERACY:

- Overview of computer terminology ("Tour") - ☐ MAC ☐ GS
- Wordprocessing-*title of data disk*_____
  - Introduction - ☐ Microsoft Word ☐ AppleWorks
  - Application - ☐ Resume ☐ Business letter
- Keyboarding/typing ("Typing Tutor") - *Color of disk label*_____
  - Beginning WPM____ ☐ Typing game Ending WPM____
- Graphics- ☐ MacDraw ☐ PaintWorks Gold ☐ Appleworks GS
- Desktop Publishing- ☐ PageMaker ☐ AWGS Page Layout
- Laser Discs- ☐ Encyclopedia ☐ Interactive Video("Dream Machine")

006A

A SKILLS CHECK

This skills check is to help you and your counselor know if you have the math, reading, writing and listening skills needed for training for this job. The instructor of the course asks that you have these skills before coming to training. If you don't have these skills, we offer classes to help you learn them. You'll only work on the skills you'll need and then you'll move into training.

Relax. Take your time.

Don't worry. If you can't do it now, you will have the opportunity to learn.

NAME_____

COUNSELOR'S NAME_____ETU_____

DATE OF YES/NO REVIEW_____

DATE ESA COMPLETED_____

SMAS CLERICAL

ENTRY STANDARDS ASSESSMENT

Applied Mathematics for Electronics

San Jose City College

Background:

For the last six years, San Jose City College (SJCC) has offered a course to serve the needs of students whose math skills were insufficient for success in Electronics 121, the first in SJCC's series of electronics math courses. This course is known as Electronics 320, Applied Math for Electronics.

Prior to the development of Electronics 320, students with math skills deficits enrolled in the college's general remedial math course. There was a gap, however, between the ending point of the remedial math course and the starting point of Electronics 121.

To bridge this gap, Ms. Barbara Snyder, a SJCC electronics math instructor with an M.S. in Mathematics, developed Electronics 320. She has taught the course since its inception.

Initially, Electronics 320 emphasized math skills. However, all electronics courses require both oral and written reports, so vocabulary skills are important to successful entry into the electronics field. In 1990-91 Ms. Snyder joined together with Dan McElroy of the Electronics department to develop a computer vocabulary tutorial program called WORDVIEW which includes all vocabulary used in the core electronics curriculum to meet the communications needs of students.

Purpose:

Students in the electronics program at SJCC are required to understand and apply a number of mathematical concepts in their courses, including two "first year" electronics math courses. Electronics 320 is designed to teach the math skills required in electronics applications, using an applied math philosophy. The course is especially helpful for re-entry students who have not used their math skills for a long time, and for ESL students.

The purpose of the WORDVIEW program is to provide a non-threatening way for self-drill on specific electronics vocabulary. Technical students can use the WORDVIEW diskettes whenever they have free time and access to a

computer. The program is operated with ease. Sentences use technical words in correct context, and the user fills in the blanks from the words at the top of the screen. Sets can be tried repeatedly, until the user has mastered the words and concepts. WORDVIEW keeps track of progress, and the user can benefit from both short and long periods at the computer.

WORDVIEW, the patient vocabulary tutor for technical students, is available for use on IBM-compatible personal computers from Barbara Snyder.

Description of Program:

Electronics 320 focuses on the skills students need to know as an electronics student and/or technician, using an applied math approach to convey the subject matter. When the course began six years ago, there were no appropriate textbooks on the market, so it was taught from notes. From the beginning, students have been expected to not only solve problems, but explain how they were solved. Actual electronics problems have been used throughout.

The course is now taught using a textbook authored by Barbara Snyder, entitled *Practical Math for the Technician: The Basics*. The book covers mathematics material ranging from the number line to algebraic and trigonometric equations. The course is designed to introduce the specialized vocabulary of electronics and to illustrate mathematical concepts with examples from electronics. The textbook includes two chapters devoted to calculator usage.

Students are made aware of this course in two ways. Some students are identified through the matriculation process: those who identify their intent to major in electronics and who score below the cutoff on the math placement test are advised to enroll in both the general remedial math course and Electronics 320. For these students, ET 320 is a pre-requisite to the more demanding electronics math courses. While counselors are supposed to tell "eligible" students about ET 320 when they go through matriculation, sometimes the counselors encourage students to immediately enroll in courses for their major. Students who find the first electronics math class a struggle are identified by the instructor and encouraged to take Electronics 320. For these students, ET 320 is an adjunct to the first semester electronics math course.

Students who complete ET 320 earn 2 units of general education credit towards their AA or certificate. These units are not counted towards the major, however.

Development:

Barbara Snyder led the development of the course and the instructional materials associated with it. She received support along the way from other electronics faculty and basic skills educators on campus. There was little collaboration, however, among academic and vocational faculty. Although the impetus for this course came from the electronics department, the Mathematics department at one time wanted to teach the course. After meeting with Ms. Snyder, and learning about her credentials and vision for the course, they agreed that she was the one to teach it.

The main barrier encountered in the development of ET 320 was resistance from those who did not perceive the need for the course and continued to encourage most students to plunge right into the first semester of electronics math, instead of pointing out ET 320 as an option. The electronics department simply reacted to whatever hurdles they met because the course was so strongly needed.

Recommendations for Replication:

The electronics faculty at SJCC feel that a course similar to theirs could be established at another college, as long as a qualified and committed person leads the effort. The instructional materials used at SJCC are copyrighted and available for purchase. The textbook *Practical Math for the Technician: The Basics* by Barbara Bode Snyder is published by Prentice Hall. An example that characterizes the approach used in this text appears below:

> "Power (rate of using energy) is normally measured in kilowatt hours, or kWH. Ten lightbulbs of 100 W each burned for one hour use one kilowatt hour. One 100 W lightbulb burned for ten hours uses one kilowatt hour.
>
> "If you are using 75 W bulbs, then one 75 W bulb burned for 13.3333333 hours uses one kilowatt hour?"
>
> "75 W = .075 kW. How many 0.075 kWs are there in 1 kW?"
>
> "1 kW / 0.075 kW = 13.33333"

Evidence of Effectiveness or Impact:

There has not been any formal evaluation of ET 320, but according to Ms. Snyder, the course has had significant impact on student retention in the electronics program among those students who need supplementary mathematics instruction. Retention rates for these students, however, are still not as high as for students who have excellent skills when they enter the program.

Ms. Snyder also reports that students who use the WORDVIEW program have better grades than those who do not.

Contact:

Barbara Snyder
(408) 298-2181
extension 3667

Sample Materials:
San Jose City College

PRACTICAL MATH FOR THE TECHNICIAN

BARBARA BODE SNYDER

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The three basic components in electronics are resistors (R), inductors (L), and capacitors (C). They can be combined in series and in parallel and in combinations of series and parallel.

When they are connected in series, there is only one path for electricity to flow through the circuit. When they are connected in parallel, there exists more than one path through the circuit. Figure 22–1 shows three each of these components combined in series, and those same three components combined in parallel.

The first three (a–c) are in series, first with resistors, then inductors, and then capacitors. Notice that an imaginary ant traveling in one direction from left to right could take only one possible route in each series circuit.

The last three (d–f) are in parallel, using the same components. Notice that an imaginary ant traveling in one direction from top to bottom would have three different choices of routes in each of the parallel circuits.

When values are given with these components, they are usually given along with prefixes, so review those prefixes and their values in Chapter Sixteen. When using the calculator, remember to allow for the appropriate prefix along with the number. To enter 4 k ohms, press 4 E 3, where E stands for the EE or EXP key on the calculator; the register will show $4.^{03}$, which is read as 4×10^3 or 4 k ohms. To enter 5 mH, enter 5 E +/− 3 which will appear as $5.^{-03}$, which is read as 5×10^{-3} or 5 millihenrys. (Remember that the +/− key is NOT the same as the subtract key.) The +/− key can be used either after or before the 3 (5 E +/− 3 or 5 E 3 +/−) as long as it is pressed after the E key is used. Answers do not have to be changed back to a prefix; they can be left in scientific notation.

Referring again to Figure 22–1, assume the following values:

resistors: 5 k ohms, 6 k ohms, 7 k ohms

inductors: 5 m henrys, 6 m henrys, 7 m henrys

capacitors: 5 n farads, 6 n farads, 7 n farads

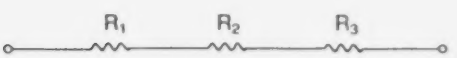


Figure 22–1(a) R_1, R_2, R_3 in series

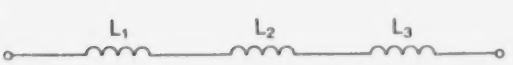


Figure 22–1(b) L_1, L_2, L_3 in series

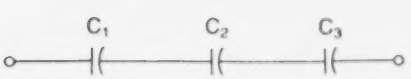


Figure 22–1(c) C_1, C_2, C_3 in series

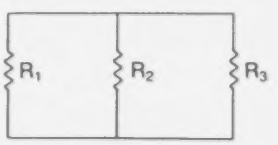


Figure 22–1(d) R_1, R_2, R_3 in parallel

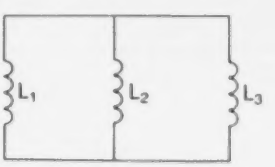


Figure 22–1(e) L_1, L_2, L_3 in parallel

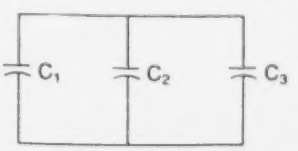


Figure 22–1(f) C_1, C_2, C_3 in parallel

Looking up the prefixes shows:

$k = 10^3$

$m = 10^{-3}$

$n = 10^{-9}$

Resistors added in series give a total resistance, Rs, by adding the resistances together. Inductors added in series give a total inductance, Ls, by adding the inductances together. Capacitors in parallel give a total capacitance, Cp, by adding the capacitances together. Therefore:

Rs = 5 k ohms + 6 k ohms + 7 k ohms = 18 k ohms

Ls = 5 mH + 6 mH + 7 mH = 18 mH

Cp = 5 nF + 6 nF + 7 nF = 18 nF

These values are easy to add together since each problem includes components with the same prefix. To do this on a calculator, it is always a good practice to insert the prefixes. Try the following calculator sequences to be sure you get the same result:

Rs: 5 E 3 + 6 E 3 + 7 E 3 =

That gives 1.8 04, which is read as 1.8×10^4, which could stay that way or be changed over to 18000 (the decimal point moves four places in the plus direction), which means the same thing as 18 k ohms.

This could be done on the calculator by dividing by the value of kilo, which is 1 E 3, and inserting the letter "k" in your written answer. The calculator sequence would be

1.8 04 ÷ 1 E 3 =

That gives

1.8 01 = 1.8×10^1 = 18

So the answer would be written and read as 18 k ohms.

Ls: 5 E +/− 3 + 6 E +/− 3 + 7 E +/− 3 =

which gives 1.8 −02, which is read as 1.8×10^{-2}, which could stay that way or be changed over to .018 (decimal point moves two places in the negative direction), which could also be read as 18 mH. This could be done on the calculator by dividing by the value of the prefix milli, which is 1 E +/− 3, and inserting the letter "m" in your written answer. The calculator sequence would be

1.8 −02 ÷ 1 E +/− 3 =

which gives 18 mH

Cp: 5 E +/− 9 + 6 E +/− 9 + 7 E +/− 9 =

which gives 1.8 −08, which is read as 1.8×10^{-8}, which could stay that way or be changed over to .00 000 0018, which could also be changed to 18 nF. This could be done on the calculator by dividing by the value of nano, which is 1 E +/− 9, and inserting the letter "n" in your written answer. The sequence would then be

$$1.8\ -08 \div 1\ E\ +/-\ 9 =$$

which gives 1.8 01 nF, which is read as 1.8×10^{1} nF = 1.8 × 10 nF = 18 nF.

In parallel circuits, the total resistance is the reciprocal of the sum of the reciprocals. The total resistance is thought of more easily as the sum of the conductances, with each conductance the reciprocal of the individual resistance. The total resistance, R_T, is the reciprocal of G_T. This is the same as saying

$$R_T = \frac{1}{G_T} = \frac{1}{G_1 + G_2 + G_3} = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}} = R_P$$

The best calculator sequence involves the 1/X key, which gives all of the intermediate G's as you progress through the sequence. Enter

$$R_1\ 1/X + R_2\ 1/X + R_3\ 1/X = 1/X$$

Using the values of 5 k ohms, 6 k ohms, 7 k ohms, the actual sequence will be

$$5\ E\ 3\ 1/X + 6\ E\ 3\ 1/X + 7\ E\ 3\ 1/X = 1/X$$

where E means the EXP or EE key on the calculator. This gives intermediate results of

$$G_1 = 2 \times 10^{-4}\ S,\ G_2 = 1.6667 \times 10^{-4}\ S,\ G_3 = 1.4286 \times 10^{-4}\ S,\ G_T = 5.0952 \times 10^{-4}\ S$$
$$\text{and } R_T = 1.9626 \times 10^{+3} \text{ ohms} = 1.96 \text{ k ohms}$$

Notice that when reciprocals are used, the total must be less than any of the parts. When reciprocals are not used, the total must be greater than any of the parts.

In parallel circuits, the total inductance, Lp, is also the reciprocal of the sum of the reciprocals, although we normally don't give a special name to the intermediate values. Enter

$$L_1\ 1/X + L_2\ 1/X + L_3\ 1/X = 1/X$$

Using the values of 5 mH, 6 mH, and 7 mH, the actual sequence for Lp will be

$$5\ E\ +/-\ 3\ 1/X + 6\ E\ +/-\ 3\ 1/X + 7\ E\ +/-\ 3\ 1/X = 1/X$$

The intermediate and final answers will be

$$2 \times 10^{2},\ 1.6667 \times 10^{2},\ 1.4286 \times 10^{2},\ 5.0952 \times 10^{2},\ 1.9626 \times 10^{-3} = 1.96 \text{ mH}$$

In series circuits, the total capacitance, Cs, is also the reciprocal of the sum of the reciprocals, although we normally don't give a special name to the intermediate values. Enter

$$C_1\ 1/X + C_2\ 1/X + C_3\ 1/X = 1/X$$

Using the values of 5 nF, 6 nF, and 7 nF, the actual sequence for Cs will be

$$5\ E\ +/-\ 9\ 1/X + 6\ E\ +/-\ 9\ 1/X + 7\ E\ +/-\ 9\ 1/X = 1/X$$

The intermediate and final answers will be

$$2 \times 10^8,\ 1.6667 \times 10^8,\ 1.4286 \times 10^8,\ 5.0952 \times 10^8,\ 1.9626 \times 10^{-9} = 1.96\ nF$$

Summarizing these results:

Rs = 18 k ohms; Ls = 18 mH; Cs = 1.96 nF
Rp = 1.96 k ohms; Lp = 1.96 mH; Cp = 18 nF

Notice that Rs, Ls, and Cp added the same way and ended up with a total value much greater than any of the starting values.

Notice that Rp, Lp, and Cs added using the reciprocal of the sum of the reciprocals and ended up with a total much smaller than any of the starting values.

In general:

- Capacitances in parallel add like resistances in series
- Capacitances in series add like resistances in parallel
- Inductances add like resistances
- Resistances in series add straight across
- Resistances in parallel add using conductances
- Conductances are measured in Siemens, which are reciprocals of ohms
- Ohms are reciprocals of Siemens

Name:

Electronics Math 122
Quiz on Chap15,16,Z,Y

Roll Book Number_____ Classtime_____ Homework? yes no part

NO TALKING NO SCRATCH PAPER--use back of this sheet

Fill in blanks with either the full word OR with the appropriate letter from the vocabulary list below. All words are not used. Some are used more than once.

a)adjacent side to theta
b)admittance
c)amperes
d)capacitance
e)capacitive
f)capacitor
g)complex number
h)conductance
i)current source
j)degrees
k)equals
l)equation
m)Farads
n)frequency
o)gons
p)grads
q)Henrys
r)Hertz
s)hypoteneuse
t)imaginary number
u)impedance
v)inductance
w)inductive
x)inductor
y)j number
z)Ohms
aa)opposite side to theta
bb)plus
cc)radians
dd)reactance
ee)rectangular number
ff)real number
gg)resistance
hh)resistor
ii)resonance
jj)resonant circuit
kk)rise
ll)run
mm)Siemens
nn)slope
oo)susceptance
pp)voltage drop
qq)voltage source
)volts

$Y\angle -\theta = G - j\ B_L$ means
____ at angle $-\theta$ = ____ - j ____ ____
and is measured in _____

$Y\angle \theta = G + j\ B_C$ means
____ at angle θ = ____ + j ____ ____
and is measured in _____

$Z\angle \theta = R + j\ X_L$ means
____ at angle θ = ____ + j ____ ____
and is measured in _____

$Z\angle -\theta = R - j\ X_C$ means
____ at angle $-\theta$ = ____ - j ____ ____
and is measured in _____

$Z\angle 0 = R + j0$ and $Y\angle 0 = G + j0$ are the notations
f o r a
_ _ _ _ _ _

How often something happens is called ____
and is measured in ____ which means
cycles per second.

In a right triangle, the longest side is the ____.

In a right triangle, the rise is the ____
and the run is the ____
and the ratio of (rise/run) is the ____.

A number which does contain a j part is
called a _____ or _____ or _____ or an ____.

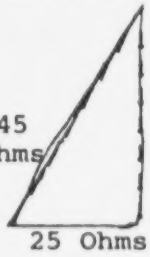
Capacitance is measured in ____.
Capacitive Susceptance is measured in ____.
Capacitive Reactance is measured in ____.

Name:

Electronics Math 122
Quiz on Chap 15,16

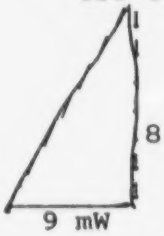
Roll Book Number_____ Classtime_____ Homework? yes no part
NO TALKING NO SCRATCH PAPER--use back of this sheet
Fill in ALL missing SIDES as well as angles. Show your work.
Use correct units.

Oscar Has A Heap Of Apples

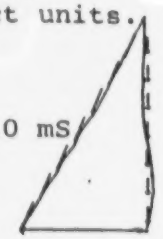


Theta =
Phi =

Theta =
Phi = 37°



Theta =
Phi =



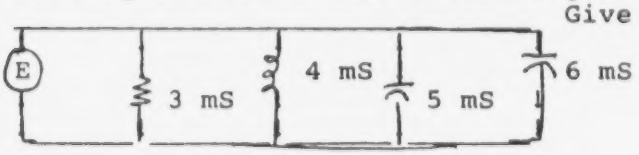
Theta = 42°
Phi =

Do following complex operations. Give answers in rectangular form.
Give quadrant in which each answer is found (I or II or III or IV).
Show all of your work. NO SCRATCH PAPER.
SQRT = "take the square root of" / = "divided by"

$$\frac{5 - j\,6}{2 - j\,3} =$$

$$\frac{1}{7 \text{ M Ohms} - j\ 3 \text{ M Ohms}} =$$

For following parallel circuit, draw the equivalent parallel circuit, giving values in Siemens. Give Y in rectangular and polar form.
Draw equivalent series circuit, giving values in Ohms.
Give Z in rectangular and polar form.



ELECTRONICS MATH 122 NUMERICAL ANALYSIS ON THE COMPUTER

The symbol splat (written as " * ") is used for multiply. Remember that EXP is the BASIC function for e^x (inverse of LN).

For each equation, first make a good detailed graph to determine how many solutions exist. If there are more than three solutions, find three of them. If there are only one or two or three solutions, find all of them. Write the solutions right on your graph, along with the name of the program used.

Each solution for X should have four numbers recorded: two values for each X (which are identical except for the last digit and where one gives a positive difference and one gives a negative difference) and the differences obtained using each value. Solutions should have at least five significant digits, which means four identical digits and the fifth digits differ by one.

Your first step is to prepare a label for your diskette. Write the label and THEN put it on the diskette. Your label should include your name, the date, and some identifying information which tells you which diskette is which. Be as complete as you can be. For instance, your label might say:

NUMERICAL ANALYSIS -- ELECTRONICS MATH 122 -- date -- Your Name

Put the label on the diskette, and then keep the diskette in the sleeve or in the computer at all times. Avoid extreme heat and magnets. Be careful with the diskette and keep it flat.

In this explanation, (ENTER) is used to mean the return key which is usually labelled as ENTER or Enter right on the key. In this explanation, "enter" is used as a direction which tells you to key in certain information.

Turn on the computer and then enter: GWBASIC (ENTER)
This gets you into the Basic program. At any time you can return to the main system by entering: SYSTEM (ENTER) While at system level, see what is on your diskette by putting the diskette in drive A and then entering: DIR A: (ENTER)

If you get all fouled up while running a program, you can start over by depressing SHIFT, ALT, DELETE at the same time. Be sure you have first SAVED anything you wanted to save. Remove your diskette from drive A while the machine reboots.

BEST COPY AVAILABLE

ELECTRONICS MATH 122 NUMERICAL ANALYSIS ON THE COMPUTER

When using BASIC the main function keys you will use will be the function keys F1 (LIST), F2 (RUN), F3 (LOAD), F4 (SAVE). If you do not have function keys, then you will have to type the words represented by the function keys.

LOAD A:NAME (ENTER) -- will LOAD program NAME from disk drive A into memory.

LIST (ENTER) -- will LIST contents of the program currently in memory. Be sure to first LOAD the program.
LIST 1 - 100 (ENTER) -- will LIST statements starting with statement 1 and continuing through statement 100

SAVE A:NAME2 (ENTER) -- will SAVE the present program with the label NAME2 on the diskette in drive A. Other labels could be BB or TEMP or NOW or PROG2 and so on.
SAVE B:NAMEB (ENTER) -- saves program NAMEB on drive B diskette

RUN (ENTER) -- will RUN the program currently in memory. Be sure to first LOAD the program. Be sure to SAVE it before you RUN it so that you can get back to it with any corrections.

Try the following sequence:

```
LOAD A:PROG1 (ENTER)      this loads program #1
LIST         (ENTER)      this lists contents of program #1
LIST 1-100   (ENTER)      this lists first part of program #1
LIST 100-999 (ENTER)      this lists second part of program #1
LOAD A:AA (ENTER)   this loads the shorter version of program #1
LIST      (ENTER)   this lists AA (program #1)
SAVE A:AAA (ENTER)  this makes backup copy of AA as AAA
SAVE A:AAAA(ENTER)  this makes another backup copy as AAAA

SAVE A:BB  (ENTER)  this makes a copy for second problem;
          For this assignment, change statements 100, 160, 170.
LIST       (ENTER)  this lists program BB.
100  REM  BB  SIN ( X / 2 ) = X / 3 - 5 (ENTER)   new program BB.
160  L = sin ( x/2) (ENTER)   this changes statement 160.
170  R = X / 3 - 5  (ENTER)   this changes statement 170.
LIST       (ENTER)  this lists this new program.
SAVE A:BB  (ENTER)  saves this new program as prog BB.
SAVE A:BBB (ENTER)  this saves backup program BBB.
```

```
SAVE A:CC (ENTER)   this saves new program CC which can be used
     for third problem; again change statements 100, 160, 170.
LIST      (ENTER)   this lists program CC
100  REM  CC   cos (2 * X ) = X - 7  (ENTER)   new program CC.
160  L = cos (2*X)  (ENTER)   this changes statement 160.
170  R = X - 7      (ENTER)   this changes statement 170.
LIST           (ENTER)   this lists this new program.
SAVE A:CC      (ENTER)   saves this new program as prog CC.
SAVE A:CCC     (ENTER)   this saves backup program CCC.
```

Continue to make copies for all problems. Then run them.

```
LOAD A:AA (ENTER)   This loads program AA
LIST      (ENTER)   This lists program AA
RUN       (ENTER)   This runs  program AA
```

Use the prompts to solve for X. For the first problem, program AA, sin x = x/4 + 2, you know from your graph that there are three solutions, and the first intersection is between -4 and -5. Try those values and then make another guess. Find the intersection to five significant digits.
Your final answer for the first solution for AA should be:

x = -4.3137 d = -4.11E-6
x = -4.3138 d = +5.94E-5

These four numbers make up one solution. List these four numbers on your graph (or a slip of paper for now).

Then solve for the other two solutions to the first problem. Be sure you have five significant digits where four digits are identical and the fifth digits differ by one, and one solution gives a positive and one a negative difference. Record these answers with the differences right on your graph.

To keep track of your answers on your diskette, make a separate program which consists entirely of remarks and an END statement. This can be changed every time you calculate a new answer and can be kept up to date. enter:

```
10   REM  ANS          Program to keep track of answers
20   REM  Student Name and Classtime and Roll Book Number
40   REM  Listing values for X and for difference d = (L - R)
60   REM  AA solves sin x = x/4 + 2
70   REM          x = -4.3137 d = -4.11E-6
80   REM          x = -4.3138 d = +5.94E-5
999  END
SAVE  A:ANS
```

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ELECTRONICS MATH 122 NUMERICAL ANALYSIS ON THE COMPUTER

program listing for PROGRAM1

```
  5  REM  PROG1 --- BASIC PROGRAM FOR ELECTRONICS 122 STUDENTS
 10  REM       Do NOT Change THIS Program For ANY Reason.
 15  REM  COPY this program with a new name, like AA or PP.
 20  REM
 25  REM  Within AA, you can eliminate all REM statements
 30  REM       with numbers less than 100.
 35  REM  Keep everything from 100 to 999.
 40  REM  You can reread these remarks at any time
 45  REM       by simplying using LOAD PROG1 (ENTER) LIST
 50  REM
 55  REM  Statement 140 sets constant K for 5 trial X's.
 60  REM  Notice that X must be in radians.
 65  REM  If you use TAN, be sure X is not an asymptote.
 70  REM  The EXP function is exponential function (e to the x).
 75  REM  The LOG function is the natural logarithm (LN).
 80  REM
100  REM  PROG1  Finds solution to SIN X = X ^ 4 - 2.
110  REM  Change statements 100, 160, 170 for other functions.
120  REM
130  PRINT  "  X          DIFFERENCE ( Left - Right )"
140  K = 5
150  INPUT "X = ",X
160  L = SIN ( X )
170  R = X  ^ 4 - 2
180  D = L - R
190  PRINT X, D
200  K = K - 1
210  If K = 0 Then 150
220  INPUT "do you wish another X --- y/n ? ",A$
230  PRINT
240  If A$ = "n" then 260
250  GO TO 999
260  If A$ = "Y" then 140
999  END
```

Occupational Readiness Program

Bakersfield College

Background:

Bakersfield College has established a working relationship with the local private industry council known as the Employers' Training Resource (ETR), and since 1982 has offered vocational training as part of the ETRs Job Training Partnership Act program. Unlike other cooperative JTPA funded programs, Bakersfield College instructors have worked to develop a specialized program that provides occupational preparation and basic skill remediation in addition to technical instruction. Funded solely through JTPA funds, the program is staffed by Bakersfield College faculty and operates from a center located within the Applied Science and Technology Division. ETR and its designated Industry Advisory Council formulated a curriculum that would teach participants the personal attributes and job skills that employers desire in their employees. The curriculum was designed so that students learn a specific skill in automotive maintenance and repair, welding, or farm/tractor mechanics; they also learn basic math and communication skills, as well as self-esteem and motivation. Although the entire program is a model for providing technical and academic skills to underprepared students, of particular interest to this study is the Occupational Readiness component of the program.

Purpose:

Working collaboratively with ETR staff, the project staff identified the needs of industry employers, and in an effort to develop well-rounded individuals to meet those needs, designed a curriculum to adequately prepare students for personal and professional success. The following components of instruction comprise the curriculum:

- Technical expertise related to students' skill area
- Writing skills and reinforcement related to students' writing skill area

- Basic math skills related to students' skill area
- Survival skills and job preparation skills
- Confidence, self esteem and motivation reinforcement

Description of the Program:

The JTPA program operates as a "college within a college". Students receive 450 hours of technical lab training through either the Automotive Maintenance and Repair (Auto 90) course or the General Welding (Welding 90) course. Students are concurrently enrolled in the Occupational Readiness (Industrial Technology 90) course for 180 additional hours of personal development and job skills related classroom instruction. Auto 90 and Welding 90 are entry level courses that teach specific introductory skills in each technical area. Progress is monitored on a daily basis. Upon completion, the students possess job skills that enable them to secure employment within their chosen area.

The Occupational Readiness course combines basic literacy, communication, and math skills, with job survival skills, and is an interesting model of integration. The course is taught by a vocational instructor so that the basic skills are directly integrated into the technical areas. The classes are taught in the traditional lecture and test format. Weak students are paired with strong students so that the success of every student is ensured. The students also develop important interpersonal skills this way. Occupational Readiness can be broken down into three components: Literacy/ Communication, Math, and Survival Skills.

The Literacy/Communication component places emphasis on reading/instructions comprehension and written expression by testing the students with questions that require a written response, as opposed to true/false responses. The students also complete technical vocabulary exercises that have been compiled from the textbook readings. Speaking and listening skills are developed by on-the-job role playing that involves speaking and listening exercises.

The Math component develops the computational skills that are necessary to function on the job. The textbooks focus on practical problems in specific technical areas that require math solutions. Basic math concepts, such as fractions, percentages, and measurement, are taught through practical vocational applications and exercises. Students are tested weekly with math competencies developed by the advisory council.

The Survival Skills component focuses on job preparation, self- esteem and motivation. Using an "environmental" approach, this component uses exercises, assessment tools, and videos which emphasize confidence and self-esteem. Job preparation is taught by resume drafting and identifying the needs and desires that students want from a job. Interpersonal communication skills are emphasized by participation in team work exercises. Students develop motivation by actively seeking certification through the competency tests.

The program is only offered to JTPA participants and eligibility is determined through an initial assessment by the JTPA/ETR staff. Basic proficiency must already be achieved by the students and the reading level of those accepted varies from fifth to twelfth grade levels. The students then attend an orientation that specifically outlines the policies and requirements of the program, and also the controlled environment which the students will enter.

The program is highly structured and the students are monitored closely. The attendance policy is like that of a job; students are required to attend all classes and be on time. Unexcused absences or excessive tardiness results in probation. Students are taught how to be dependable. The program seeks to provide not only specific job skills, but knowledge of how to obtain employment and be successful on the job.

In addition to the competency tests administered within the classroom or lab setting, the instructor evaluates the students on a monthly basis with their own competency tests. This includes a formal one-on-one evaluation that is documented in triplicate.

Upon completion of the program, students receive 12 units of non-transferable credit and a JTPA certificate. ETR arranges for job interviews and the students are monitored until employment is achieved.

Development:

This program is constantly reviewed and updated to meet the changing needs of both students and industry. Effective communication is necessary to this process. By monitoring student progress closely through competencies and tests, weak areas can be identified and corrected. The Industry Advisory Council provides valuable input for the needs of potential employers. They meet once or twice annually to review the changing needs of industry. Administrative support for the program was gained through the successful results of the program. The Vocational Faculty coordinate the efforts of all areas.

Recommendations for Replication:

The key component to the success of this program is a dedicated staff. Support must be present at all levels, from the Dean of Instruction to the Teacher Assistants who assist in the lab and classroom settings. The cost per student placement is $3,000 to $4,000 (this includes technical training component); therefore, it is necessary to secure outside funding for a project such as this.

Evidence of Effectiveness or Impact:

According to college staff, this program is seen as highly successful for several reasons. There is a marked change in student appearance, motivation, and self-esteem by the end of the program. The program serves 100-120 students per year with only a 25-30% rate of attrition. Also, the classes and labs have a 90% attendance rate. The placement rate for students who finish the program is high: 71%-75% for the welding program, and over 65% for those who complete the automotive training.

Contact:

Larry Fanucchi
(805) 395-4571

Sample Materials:
Bakersfield College

REVISED: 4-19-88

INDUSTRIAL TECHNOLOGY 90
OCCUPATIONAL READINESS

IND TECH 90 OCCUPATIONAL READINESS (3 to 10 units)
Provides student with the survival skills necessary to be successful in their chosen occupational area. Units on communication, computation and technical skills emphasize the use of these skills in job related situations. Job survival skills include procedures and processes of securing a job, maintaining a job and work ethics. Prerequisites: Reading Level A or evaluation by instructor. Concurrent enrollment in either WELD 90 or AUTO 90. Hours: (54-180) 10 lecture. Repeat: 1. CCS: Occupational Education. Not Transferable: Associate Degree only.

Description for Counselor's Handbook: This course has been developed to provide students with the skills that employers feel are lacking in many of the potential employees they see. The course materials attempt to simulate in every way possible, actual practices as they are used on the job.

Textbook: For Welders: Practical Problems in Mathematics for Welders, John G. Bradley, Delmar Publishers, copyright 1982, latest edition. Weld Symbols, Hobart Bros., copyright 1974, latest edition. Miller Welding Modules, Miller Welding Co., copyright 1975, latest edition. For Auto: Automotive Mechanics, William H. Crouse, McGraw Hill, 9th edition, 1984. Practical Problems in Mathematics for Automotive Technicians, Delmar Publishers, copyright 1985, latest edition. Supplemental textbooks: Your Attitude is Showing, Chapman, third edition, 1977. You and Success in the Working World, Abernathy, third edition, 1979.

Course Goals and Objectives:

Goal 1. Develop communication skills necessary to obtain a job and successfully function in that job.

Objectives:
a. Students will develop reading skills by doing exercises based on textbook reading, technical manual reading, trade journals, safety instructions, written technical tests and technical vocabulary exercises.
b. Students will develop speaking and listening skills by simulating actual on-the-job circumstances involving speaking and listening skills.
c. Students will develop writing skills by doing exercises in resume writing, application forms, work and job order preparation.

Goal 2. Develop computational skills necessary to function on the job.

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PREPARED BY: Duane L. Dooley
REVISED: 3-30-88

AUTO 90
AUTO MAINTENANCE AND REPAIR

AUTO 90 AUTOMOTIVE MAINTENANCE AND REPAIR (3-12 units)
Engine components, chassis, brake, air conditioning service, and basic engine tune-up. Prerequisites: Minimum of Reading Level 1, or evaluation by program coordinator. Concurrent enrollment in the Bakersfield College Employer's Training Resource Program (ETR); concurrent enrollment in IND E 90. Hours: (113-452) 5 lect, 20 lab. Open entry/open exit. Repeat: 1 or until a limit of 12 units is reached. CCS: Occupational Education. Not Transferable: Associate Degree only.

Description for Counselor's Handbook: This program is designed to provide short term training under JTPA regulations section 203. Emphasis is placed on developing entry level skills in limited areas of the auto repair industry.

Text: Automotive Mechanics, Workbook, Ninth Edition, Crouse/Anglin, current edition.

Course Goals and Objectives:

Goal 1. The student will understand how an auto repair facility functions, know and practice safe working habits.

Objective: The student will be given a safety manual, lectures on safety and lab demonstrations on safety. He/she will know all safety precaution and must pass the safety written exam with a 95% score before he/she may work in the automotive lab.

Goal 2. The student will know how to use and care for basic hand tools and specialized automotive testing tools properly.

Objective: The student will demonstrate his/her ability to identify all commonly used auto repair tools by taking a tool identification test. The students will demonstrate their proper use by tests conducted by the instructor and instructor observations during shop activity.

Goal 3. The student will understand the basic operation principals for brake systems, suspension components, engine components, air-conditioning systems.

Objective: The student will demonstrate knowledge of theory of brake, suspension, engine components, tune-up, and air

conditioning systems by written and oral tests conducted by the instructor. The student will achieve test scores of at least 70% correct.

Goal 4. The student will understand the proper procedures for servicing brake systems, suspension components, engine components and air conditioning systems and be able to perform basic tune-up and diagnosing procedures.

Objective: The student, given the proper tools, test equipment and spec manuals, will demonstrate correct repair procedures aby performing prescribed operations in brake, suspension, engine and air conditioning components as well as tune up operations. The student will perform the operations using the proper tools and procedures and in the time prescribed by industry standards (reference flat rate manual) to the score of at least 75%.

Goal 5. The student will develop skills and attitudes that will help him/her locate and retain a job.

Objective: The student will demonstrate proper job finding and holding skills by being properly attired, properly groomed, and on time for all class activities as judged by the supervising instructor.

Evaluation: The student will have written or oral examination, completion of lab study sheets and assigned laboratory activities. These evaluation methods will be used for each unit covered and the total points earned will count for the final or course grade.

Course Outline:

Unit 1.	BASIC SHOP ORIENTATION	25 hrs
	A. Introduction to the Automotive Service Ind.	
	B. Safety	
	C. Basic Hand Tools	
	D. Shop Manuals	
Unit 2.	CHASSIS COMPONENTS SERVICE	50 hrs
	A. Tire Service	
	B. Shock Absorbers and McPherson Struts	
	C. Front End Alignment	
Unit 3.	BRAKE SERVICE	75 hrs
	A. Drum Type	
	B. Disc Type	
	C. Master Cylinder Service	
	D. Vacuum and Hydro-boost	
Unit 4.	ENGINE COMPONENT TESTING (removal and replacement)	100 hrs
	A. Batteries	

B. Ohms Law
C. Alternators
D. Starters
E. Oil and Filters
F. Water Pumps, Radiator Hose, Thermostat
G. Carburetors

Unit 5. HEATING AND AIR-CONDITIONING SERVICE 100 hrs

A. System Theory
B. System Diagnosis
C. System Service

Unit 6. BASIC TUNE-UP 100 hrs

A. System Operation
B. Diagnosing Procedures and Tools
C. Component Service
D. Adjustments

INDEX OF TASKS
AUTO 90

TEXT BOOK NO._____ STUDENTS NAME:_____

SAFETY TEST._____ START DATE:_____

HOURS POSS._____ FINISH DATE:_____

TOTAL HOURS:_____ ATENDANCE AVERAGE:_____

GRADE:_____ JOB TEST AVERAGE:_____

SHOP WORK AVERAGE:_____

BRAKES, TIRES AND FRONT END:

TASK		
51	AUTOMOTIVE BRAKE SYSTEM.....	
52-1	PARKING BRAKE ADJUSTING.....	
52-2	DISK-BRAKE SERVICE.....	
53	DRUME-BRAKE SERVICE.....	
53	TIRE INSPECTION AND SERVICE.....	
48	SPRINGS AND SUSPENSION SYSTEM.....	
49	STEERING SYSTEM.....	
50-1	CHECKING WHEEL BEARINGS.....	
50-2	CHECKING BALL JOINTS.....	
48-1	REMOVE AND REPLACE SHOCK ABSORBERS.....	
50-4	BALANCE WHEELS.....	
50-5	PACK WHEEL BEARINGS.....	
50-6	ALIGN FRONT-END.....	

AUTO AIR CONDITIONING:

TASK		
54	AIR CONDITIONER MAINTENANCE CHECKS.....	
55-1	CONNECTING GUAGE SET & CHECKING PRESSURES.....	
55-2	CHARGING THE SYSTEM USING A GUAGE SET AND SMALL CANS OF REFRIGERANT.....	

ENGINE COMPONENTS:

TASK		
8	ENGINE FUNDAMENTALS MEASUREMENTS.....	
9	PISTON-ENGINE OPERATION.....	
10	ENGINE TYPES.....	
11	ENGINE CONSTRUCTION.....	
12	VALVES & VALVE TRAINS.....	
13	ENGINE MEASUREMENTS & PERFORMANCE.....	
14	AUTOMOTIVE ENGINE FUELS.....	

ENGINE COMPONENTS CONTINUED

TASK		
15	AUTOMOTIVE FUEL SYSTEMS.....	
16	AUTOMOTIVE CARBURETORS.....	
17-1	AIR CLEANER SERVICE.....	
17-2	TESTING FUEL PUMPS.....	
17-3	ADJUSTING CARBURETORS.....	
20	CHANGING OIL & OIL FILTERS.....	
21	ENGINE COOLING SYSTEM.....	
22-1	THERMOSTAT TESTING & REPLACEMENT.....	
22-2	CHECKING, FLUSHING & CLEANING COOLING SYSTEMS..	
23	USING JUMPER WIRES & TEST LIGHTS.....	
24-1	SERVICING & CHARGING BATTERIES.....	
24-2	TESTING AUTOMOTIVE BATTERIES.....	
25-1	TESTING THE STARTING SYSTEM.....	
25-2	REBUILDING ALTERNATORS.....	
26-1	CHECKING CHARGING SYSTEM.....	
26-2	REBUILDING ALTERNATORS.....	
26-3	CHECKING ALTERNATORS, ROTORS,STATORS,&DIODS....	

AUTOMOTIVE TUNE-UP

TASK		
27-1	SPARK PLUG SERVICE.....	
27-2	INSTALLING CONTACT POINTS.....	
27-3	DISTRIBUTOR REMOVAL & INSTALLATION.....	
27-4	ADJUSTING IGNITION TIMING.....	
28	ELECTRONIC IGNITION SYSTEMS.....	
29	SCOPE-TESTING ELECTRONIC INGITION SYSTEMS.....	
33-1	ENGINE-TESTING INSTERMENTS.....	
33-4	ENGINE TUNE-UP.....	
34-1	ENGINE WILL NOT CRANK.....	
34-2	ENGINE CRANKS BUT DOES NOT START.....	

INSTRUCTOR: Mark Dommer
REVISED: 4-14-88

WELDING 90
GENERAL WELDING

WELD 90 GENERAL WELDING (12 units)
Entry level welding skill development in modern welding and cutting processes, theory and practice. **Prerequisites:** Reading Level 2, concurrent enrollment in Industrial Technology 90 (Occupational Readiness) and eligibility for the Bakersfield College Employer's Training Resource Program. **Hours:** (450) 6 lect, 19 lab. **CCS:** Occupational Education. **Not Transferable:** Associate Degree only.

Description for Counselor's Handbook: This course has been designed to give the student the opportunity to develop entry level welding skills. Emphasis is placed on safe and proper operation of varied welding processes and related equipment.

Text: Shielded Metal Arc Welding - Miller Module Method, Miller Electric Mfg. Co,and Kirkwood Community College Facilities Foundation, 1975. Introduction to Pipe Welding - Miller Module Method, Miller Electric Mfg. Co, and Kirkwood Community College Facilities Foundation, 1978.

Course Goals and Objectives:

Goal 1. To develop safe work habits pertaining to the proper operation f welding tools and equipment.

Goal 2. To develop and acquire manipulative and technical skills necessary to successfully operate welding tools and equipment.

Goal 3. To develop a clear understanding of the parameters of different welding processes.

Goal 4. Develop proper skills and attitudes to successfully obtain employment in the welding profession.

Objectives: The student, given the proper instruction, tools and equipment, will show competency in manipulative tasks and related knowledge as listed below. The student's knowledge and skill level will be displayed by acquiring a minimum 70% score on all lab exercises and examinations as detailed in the exercise evaluation outline sheet.

1. Discuss and demonstrate safety requirements pertaining to the proper operation of welding tools and equipment.
2. Demonstrate ability to set up a variety of welding machines for different welding applications.
3. Discuss and identify various welding electrodes.
4. Discuss the various polarities and their application to welding.
5. Explain the various accessories related to welding.

6. Describe weld discontinuities and defects related to acceptable welding standards.
7. Describe various welding power source designs.
8. Demonstrate ability to set up and utilize the Shielded Metal Arc (stick), Gas Tungsten Arc (TIG), Gas Metal Arc (MIG), and Flux Core Arc Welding Processes on various materials.
9. Demonstrate ability to interpret welding blueprints for fabrication.
10. Demonstrate safe and proper use of the oxy-acetylene cutting torch for proper fit-up and fabrication.
11. Demonstrate ability to layout different pipe and plate joints and successfully weld them according to the ASME and AWS codes.

Required Equipment and Accessories: Most equipment necessary to successfully perform in the welding lab such as goggles, helmet, chipping hammer, welding leathers, and so forth are supplied to the student. Students are also supplied the first pair of safety glasses and gloves. It should be realized, however, that additional accessories such as welding hats, additional gloves and so on are the responsibility of the student. A prime responsibility of the student is the expectation that they will come to lab dressed in the proper welding apparel. This includes a pair of durable pants (preferably jeans) and boots. If acquisition of these two items are a problem it is advisable to discuss this problem with the instructor.

Safety Policy: One of the primary goals of this course is to develop proper safety skills and attitudes. Secondly, anyone participating in the welding lab has the responsibility to safely protect themselves and their peers. Thirdly, industry employers appreciate a person that has developed and practices a safe working attitude toward their occupation, therefore, the whole area of safety is continually discussed, expected and reinforced in the welding lab.

Attendance Policy: Various members of the welding community stress the importance of having personnel that are dependable. It is for this reason that we require 90% attendance in order to acquire a "Record of Achievement" or have the opportunity to take the various welder qualification (certification) tests.

Instructional Methodology: Instruction will be by lecture, demonstration and lab exercises.

Evaluation Policy: A student's welding progress, attendance and attitude are continually evaluated by the instructor.

A. Lab exercises - Lab exercises are evaluated on an on-going process in positive communication with the instructor or teaching assistant. These exercises are evaluated visually and/or mechanically based on commonly developed industry standards as follows:

   1. Conformity to job specifications
   2. Smooth and continuous welds
   3. A lack of overlap, undercut and cracks

Course Content: (**Approximate Hours)

A. Safety (ongoing process) 3 hrs

B. Shielded Metal Arc Welding 168 hrs
(Stick or Arc Welding)

1) Electrode Classification and Identification
2) Power Source
3) Numerous exercises performed using such elecrodes as E-7024, E-7018, E-6013, E-6011, and E-6010.
4) Building a pad with electrodes in the flat and horizontal position.
5) Lap, tee-fillet, butt, and pipe to plate joints, etc.
6) All position welding is emphasized with all electrodes except E-7024.
7) Proper techniques in welding thick and thin material

C. Welder Qualification (Certification) Tests 77 hrs

1) AWS D1.1 Structural Plate Test, E-7018 (required)
2) Optional - 4G (Overhead) plate test
3) Technical information and welding techniques related to the various welding codes
4) Proper test and coupon preparation
5) Common inspection and testing techniques such as visual, guided bend, and tensile.

D. Gas Metal Arc Welding (MIG or Wirefeed) 39 hrs

1) Set-up and operation of equipment
2) lap, tee-fillet, corner weld, and building of a pad
3) Welding of thick and thin mild steel

E. Flux Core Arc Welding 37 hrs

1) Set-up and operation of FCAW equipment
2) Proper welding techniques

F. Gas Tungsten Arc Welding (TIG or Heliarc) 37 hrs

1) Set-up and operation of equipment
2) Running puddles and beads
3) Lap, tee-fillet, and butt joints on mild steel, aluminum, and stainless steel.

G. Cutting Layout and Fabrication Techniques 61 hrs

1) Practical fabrication and welding repair jobs which simulate industry (job shop exercises)
2) Laying out projects with common layout tools

4. Proper leg dimensions and weld joint geometry
5. Clean welds lacking in slag inclusions

B. Examinations: Examinations are given throughout the eighteen weeks based on lecture, demonstration and required homework assignments. All exams will be announced in advance.

C. Quizzes: Quizzes are given throughout the semester and are written or manipulative (welding) in format. All quizzes will be announced in advance.

D. Homework Assignments and Required Readings: The instructor will assign reading from the text and give homework assignments which supplement lectures and demonstrations. All assignments are to be handed in to the instructor on the stated due date.

E. Grade Scale - A 172 - 155 (total points)
B 154 - 134
C 133 - 121
D 120 - 104
F 103 - 0

F. If the student enters employment before he/she completes the eighteen week program, his/her total point score and grade will be adjusted to reflect the percentage of time he was enrolled in class.

Record of Achievement: A "Record of Achievement" has been developed to communicate to employers the student's level of competency on various welding processes and tasks. Upon completion of the program, a student is awarded this certificate if they have maintained a grade of "C" or higher in lab and class and has satisfactory attendance (90%).

Welder Qualification (Certification): If the above criteria are fulfilled, the student has the opportunity to take various welding tests according to accepted welding codes. These exams will be witnessed by a Certified Welding Inspector and if passed successfully, will be sent in to an independent testing lab for evaluation and development of the test report. These tests are given at no expense to the ETR welding student.

3) Practice cutting angles, fitting and welding items together.
4) Develop proficiency in manual flame cutting techniques.

H. Miscellaneous 28 hrs

1) Heat and bend metal with heat
2) Straighten metal with heat
3) Understand heat distortion and how to control it
4) Field trips
5) Special demonstrations
6) Guest speakers
7) Final and review examinations

***It should be realized that most lab activities utilize a self paced mode of instruction which will cause variation in time each student spends on each exercise.

Since the primary method of instruction is student self paced, as noted earlier, the number of competencies and welding processes completed by the student will vary depending on the level of motivation, quality and quantity of work. Listed below are many competencies that a student is not required to complete but may encounter if time permits (thus improving his employability):

a. Welder Qualification (Certification testing according to a specific code.)
1) Flux Core Arc Welding
2) Gas Metal Arc Welding (MIG)
3) Gas Tungsten Arc Welding (TIG)
4) Other tests as dictated by industry

b. Oxy-Acetylene Brazing
1) Lap Weld
2) Butt Weld

c. Oxy-Acetylene Welding
1) Corner Weld
2) Lap Weld
3) Welding of Exhaust Tubing
4) Butt Weld Using 10GA

d. Blueprints
1) Multiview Projection
2) Welding Symbols
3) Blueprint Reading and Interpretation

e. Pipewelding
1) Layout
2) Cutting
3) Welding
4) Testing

f. Carbon Arc Cutting (Air Arc)
   1) Cutting Plate
   2) Beveling
   3) Scarfing Old Welds, etc.

g. Hard Facing
   1) Application
   2) Electrode Selection

ETR MONTHLY EVALUATION - WELDING

Name: _____ Evaluation month: _____

Entry Date: _____

Social Security #: _____ Completion Date: _____

Weld Fund. Safety Exam: _____ O.A. Safety Exam: _____

Rating Scale:

4) Excellent: is able perform these skills in a very effective manner.
3) Good: is able to perform these skills in an effective mannner.
2) Fair: is able to perform these skills in an acceptable manner.
1) Poor: is unable to perform these skills or has only very limited ability to perform them.

****

Evaluation Dates					
Grade to Date					

Competency:

#1 Knowledge of Shielded Metal Arc Welding					
#2 Knowledge of Typical Weld Joints					
#3 Knowledge of Polarities and Effects.....					
#4 Knowledge of Preparation for Qualification Tests ...					
#5 Knowledge of AWS Structural Plate Test.....					
#6 Knowledge of Gas Metal Arc Welding.....					
#7 Knowledge of Flux Core Arc Welding.....					
#8 Knowledge of Gas Tungsten Arc Welding (Alum).....					
#9 Knowledge of Gas Tungsten Arc Welding (Mild Steel) .					
#10 Knowledge of Cutting and Fabrication					

Working Skills:

#1 Safe Work Habits					
#2 Positive Working Attitude.....					
#3 Positive Motivation and Career Goals					
#4 Attendance - Total Student Hours (Lab/OR)					
#5 Attendance - Total Possible Hours (Lab/OR)					
#6 Attendance - Percentage (Lab/OR)					

Qualification Tests Completed:

1. AWS D1.1 Structural 3/8" Plate Test E7018-3G					
2. AWS D1.1 Structural 3/8" Plate Test E7018-4G					
3. AWS D1.1 Structural 3/8" Plate Test FCAW 3G					
4. Other _____					

Comments: _____

_____

_____

_____

Student Signature/Date

1. _____
2. _____
3. _____
4. _____
5. _____

Instructor Signature/Date

1. _____
2. _____
3. _____
4. _____
5. _____

ETR
MONTHLY EVALUATION
AUTO 90

MONTH:_____ DATE:_____ NAME:_____

SAFETY:_____ START DATE:_____

ATTENDANCE POSSIBLE:_____ FINISH DATE:_____

ATTENDANCE ACTUAL:_____ SHOP WORK:_____

GRADE TO DATE:_____ CLASSROOM WORK:_____

BRAKES TIRES & FRONT-END:

MASTER CYLINDER.....	
BRAKE SYSTEM.....	
PARK BRAKE ADJUST.....	
DISK-BRAKE SERVICE.....	
DRUM-BRAKE SERVICE.....	
TIRE INSPECTION.....	
SPRINGS & SUSPENSION.....	
STEERING SYSTEM.....	
WHEEL BEARINGS.....	
PACKING WHEEL BEARINGS...	
SHOCK ABSORBERS.....	
WHEEL BALANCE.....	
FRONT-END ALIGNMENT.....	

AUTO AIR CONDITIONING:

A\C MAINTENANCE CHECKS...	
GAUGE PRESSURE CHECKS....	
CHARGING & EVACUATION....	
HEAT & VENT SYSTEM.....	

ENGINE COMPONENTS & ELECTRICAL:

ENGINE MEASUREMENTS.....	
ENGINE TYPES.....	
ENGINE CONSTRUCTION.....	
CYL. HEADS & VALVES.....	
ENGINE PRINCIPLES.....	
ENGINE FUELS.....	
FUEL SYSTEM.....	
CARBURETORS.....	

ENGINE COMPONENTS & ELEC.

AIR FILTER SERVICE..	
FUEL PUMP TESTING...	
CARB. ADJUSTMENT....	
LUBRICATING SYSTEM..	
COOLING SYSTEM.....	
BASIC ELECTRICITY...	
JUMPER WIRES & TESTS	
SERVICING BATTERIES.	
TESTING BATTERIES...	
CRANKING SYSTEM.....	
CHARGING SYSTEM.....	
ROTOR,STATOR,DIODES.	

AUTOMOTIVE TUNE-UP:

IGNITION SYSTEM.....	
DISTRIBUTOR R & R...	
IGNITION TIMING.....	
ELECTRONIC IGNITION.	
SCOPE TESTING.....	
POLLUTION CONTROL...	
ENGINE TUNE-UP.....	
SPARK PLUG SERVICE..	
CHARACTERISTICS OF AIR POLLUTION.....	

ATTITUDE:

EXCELLENT.....	
GOOD.....	
NEEDS IMPROVEMENT...	
POOR.....	

COMMENTS:_____

SIGNATURE:_____ DATE:_____

INSTRUCTOR'S SIGNATURE:_____ DATE:_____

ETR Welding Program Name: _____

Exercise Evaluation Outline

Rating Scale

4. Excellent:
Is able to perform these skills in a very effective manner.

3. Good:
Is able to perform these skills in an effective manner.

2. Fair:
Is able to perform these skills in an acceptable manner.

1. Poor:
Is unable to perform these skills or has only very limited ability to perform them.

Evaluation Criteria

1. Conformity to job specification
2. Smooth and continous weld
3. No overlap, undercut or cracks
4. Proper leg dimensions and joint geometry
5. Clean welds lacking in any slag inclusions

Compentency 1 - Introduction (Multiple-pass buildup on X)

Shielded Metal Arc Welding
Notes: 4 ea. 1/4" x 1-1/2" x 6" Mild steel, 1/8" E6010, DCRP

_____ Tie-ins (stops and starts)

_____ Flat pad - stringers, 1st quadrant

_____ Horizontal pad - stringers, 2nd quadrant

_____ Vertical pad - stringers, 3rd quadrant

_____ Weave bead - circular and half moon, 4th quadrant

Competency 2 Typical Joints

Notes: 1/4" x 1-1/2" Mild Steel, 1/8" E6010, DCRP

_____ Lap Weld, 2 pass, stringer and weave

_____ T-Fillet, 2 pass, stringer and weave

BEST COPY AVAILABLE

_____ T-Fillet, 3 stringers

_____ Pipe-to-plate, 3 stringers

Competency 3 - Various Electrodes

Notes: 1/4" x 1-1/2" x 4" mild or 1/8" x 1-1/2" x 4" mild steel (or as indicated)
Investigate and become aware of the various polarities and the effect it has on different electrodes.

_____ E7024 Tee Fillet, 3 stringers (A.C. or DCRP)

_____ E6011 Lap Weld 1/8" mild steel, 1 stringer (A.C. or DCRP)

_____ E6013 Lap Weld 1/8" mild steel, 1 stringer (A.C., DCRP or DCSP)

_____ E6010 3/32" Lab Weld 16 Ga. Mild Steel, 1 stringer, Vertical down (DCRP)

Competency 4 - Preparation for Structural Plate Test

Note: Discuss with the instructor or teaching assistant the proper techniques and procedures for successfully completing the A.W.S. structural plate test.
You will want to make certain that the proper padding technique is utilized.

_____ Flat - 1/8" 7018, multiple pass pad with stringers

_____ Horizontal - 3/32" or 1/8" E7018, multiple pass pad with stringers

_____ Vertical up - 3/32 or 1/8" E7018, multiple pass pad with stringers (slight weave)

Competency 5 - Structural Plate Welder Qualification Test (A.W.S. D1.1 Welding Code)

Note: Discuss with the instructor or teaching assistant the requirements and procedures for taking welding tests.

_____ 3 G Plate Test - 3/32" or 1/8" E7018

Competency 6 - Gas Metal Arc Welding (MIG)

_____ Tee fillet, 2 pass, stringer and weave

_____ Lap weld, 2 pass, stringer and weave

_____ Lap weld, 16 ga. mild steel, 1 pass
(Suggestion: 16 v @ 60 AMPS)

_____ Multiple pass tee fillet vertical down

_____ Multiple pass tee fillet vertical up

Competency 7 - Flux Core Arc Welding

_____ Tee fillet, 2 pass, stringer and weave

_____ Tee fillet, multiple pass, vertical up

Competency 8 - Gas Tungsten Arc Welding (TIG) - Mild or Stainless Steel (Set-up: DCSP, 2% thoriated tungsten (red), High freq. start, pointed electrode)

_____ Mild Steel, carry a puddle with no filler (1/8" x 1-1/2" x 4")

_____ Mild Steel, lap weld, 1 pass 1/8" x 1-1/2" x 4" flat bar

_____ Mild Steel, tee fillet, vertical-up 1/8" x 1-1/2" x 4"

Competency 9 - Gas Tungsten Arc Welding (TIG) - Aluminum (1/8" x 1-1/2" x 4")

_____ Carry a puddle with no filler

_____ Lap weld, 1/8" aluminum plate, 1 pass

_____ Tee fillet 1/8" aluminum plate, 1 pass

_____ Tee fillet 1/8" aluminum plate, 1 pass, vertical-up (Set-up: A.C. , Pure tungsten (Green), High freq. - continuous, rounded electrode)

Competency 10 - Cutting, Layout & Fabrication Techniques

Job Shop Exercises (practical fabrication & welding repair jobs).

_____ Description (1 required)_____ Date _____

_____ Description (optional) _____ Date _____

_____ Description (optional) _____ Date _____

_____ Review of measuring principles

_____ Use of various layout tools and equipment

_____ Fit-up parts for welding

_____ Flame cut steel with oxy-acetylene

_____ Utilize curv-o-mark to effectively layout objects

_____ Utilize Lee patterns to effectively layout objects

_____ Utilize centering head in the layout of pipe

_____ Plasma Arc Cutter (Aluminum, Stainless & galvanized materials)

_____ Carbon Arc Cutting

Competency 11 - Final review and Examination (18th week)

Note: Listed below are various welding processes in which you should be fairly proficient in performing. The instructor will randomly select a group of the following to be tested.

_____ E6010 All position

_____ E7018 All position

_____ GMAW (MIG) All position

_____ GTAW (TIG) Flat & Horizontal

_____ Oxy-Acetylene cutting techniques

_____ Instructor's choice

Extra Credit

_____ Oxy-Acetylene Welding, Fusion Weld - 1/8" x 1-1/2" x 4" mild steel lap weld

_____ Oxy-Acetylene Welding, Fusion Weld - 1/8" x 1-1/2" x 4" mild steel butt joint

_____ Oxy-Acetylene Welding, Brazing - 1/8" x 1-1/2" x 4" mild steel lap joint

_____ Flux Core Qualification Test. AWS D1.1 Structural plate test. 3/8" plate, 3G position, vertical-up with a 15 bevel.

_____ Gas Metal Arc (MIG) Qualification Test. AWS D1.1 Structural Plate Test. 3/8" plate, 3 G position, Vertical-up with a 15 bevel.

_____ Gas Tungsten Arc (TIG) Qualification Test. Aluminum or Mild Steel, Tee Fillet.

_____ Aluminum MIG (Spool Gun)

_____ 1/4 - 3/8" aluminum, lap weld, 2 pass stringer and weave

_____ 1/4 - 3/8" aluminum, tee fillet, 2 pass, stringer and weave

Extra Credit - Preparation for Pipe Welding

_____ Pipe simulation, pipe to plate, 30 passes, E6010, veritical down.

_____ Pipe simulation, pipe to plate, 30 passes, E6010, vertical up.

_____ Shielded Metal Arc Welding 4G (Overhead) Structural Plate Qualification Test. E7018 electrode, 3/8" plate with a 22-1/2 degree bevel.

_____ Pipe simulation, pipe to plate, 30 passes, E7018, vertical up.

_____ Root pass simulation, 1/4" Corner joint with 1/16" root opening, E6010, Vertical down.

_____ 5 G Pipe Weld, E6010 (vertical down) E6010 root & hot pass E7018 remainder (vertical up).

_____ 6 G Pipe Weld, E6010 (vertical down) root & hot pass, 7018 remainder (vertical up), 37-1/2 degree bevel.

Extra Credit - ASME Section IX Welder Qualification

_____ Qualification pipe test (2" sch. 160, 37-1/2 degree bevel, 6 G position, E6010 root and hot pass [vertical down] and E7018 remainder [vertical up].

BAKERSFIELD COLLEGE

WELDERS' OCCUPATIONAL READINESS REQUIRED WORK

NAME_____ START DATE_____ END DATE_____

MATH DIAGNOSTIC TESTS	Date Finished	% Correct	Comments
Entry	_____	_____	1st Week
Exit	_____	_____	17th Week
VOCABULARY (weekly)			
Test 1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____
6	_____	_____	_____
7	_____	_____	Mid-Term Test
8	_____	_____	_____
9	_____	_____	_____
10	_____	_____	_____
11	_____	_____	_____
12	_____	_____	_____
13	_____	_____	_____
14	_____	_____	_____
15	_____	_____	_____
16	_____	_____	_____
17	_____	_____	Final Test
MATH			
whole numbers	_____	_____	_____
+ - decimals.	_____	_____	_____
x ÷ decimals	_____	_____	_____
+ - fractions	_____	_____	_____
x ÷ fractions	_____	_____	_____
JOB READINESS			
Job Search	_____	_____	_____
Resume	_____	_____	_____
Application #1	_____	_____	_____
#2	_____	_____	_____
#3	_____	_____	_____
Interview.	_____	_____	_____
_____	_____	_____	_____

FAILURE TO MAINTAIN 65% OR HIGHER MAY RESULT IN TERMINATION FROM THE PROGRAM.

ASSIGNMENT/EXAMINATION	Date Finished	% Correct	Comments
Oxy-Acetylene Cutting			1st week
Welding Fundamentals			2nd week
Welding Electrodes			3rd week
Flat, Horizontal, Vertical & Overhead Positions			4th week
Plate Qualification			5th week
Metallurgy			
AWS Weld Symbols Part I			
Part II			
Part III			
Blueprint Reading			
Pipe Welding Modules 1 & 2			
Module 3			
Alloy Steel			
TIG/GTAW			
MIG/GMAW			

ARTICLES IN ATTITUDE & JOB SUCCESS

FAILURE TO MAINTAIN 65% OR HIGHER MAY RESULT IN TERMINATION FROM THE PROGRAM.

FINAL EVALUATION

Attendance: Absences _____ Tardies _____

Comments: _____

_____

_____

Applied Science & Technology Name: _____ S.I._____ Book# _____
ASIGNSHT 3/7/91 Start Date: _____ End Date: _____

AUTO MECHANICS OCCUPATIONAL READINESS REQUIRED WORK

		READ CHAPTER	EXAM	VOC	WORK SKILLS	DA
Unit 1	Safety	2 - pgs. 14-23	_____	_____	_____	_____
Unit 2	Health & Safety	H & S Module	_____	_____	_____	_____
Unit 3	Automotive Careers	1 - pgs. 1-11	_____	_____	_____	_____
Unit 4A	Measuring Instruments	4 - pgs. 43-64	_____	_____	_____	_____
4B	Common Hand Tools	4 - pgs. 43-64	_____	_____	_____	_____
Unit 5	Fasteners & Fittings	3 - pgs. 26-40	_____	_____	_____	_____
Unit 6	Preventive Maintenance	P.M. Module	_____	_____	_____	_____
Unit 7	Shop Manuals/Flat Rate	5 - pgs. 67-82	_____	_____	_____	_____
Unit 8	Test Equipment	T.E. Module	_____	_____	_____	_____
Unit 9	Electrical	18 - pgs.347-362	_____	_____	_____	_____
Unit 10	Electrical Wiring Diagrams	34 - pgs.695-719	_____	_____	_____	_____
Unit 11	Fuel Systems	14 - pgs.249-264	_____	_____	_____	_____
Unit 12	Bearings & Seals	B & S Module	_____	_____	_____	_____
Unit 13	Oils & Lubricants	11 - pgs.187-208	_____	_____	_____	_____
Unit 14	Brake Systems	28 - pgs.568-581	_____	_____	_____	_____
Unit 15A	Master Cylinders	28 - pgs.565-580	_____	_____	_____	_____
15B	Power Boosters	28 - pgs.565-580	_____	_____	_____	_____

MATH	Score	Date		Score	Date
Whole Numbers	_____	_____	+ and - Decimals	_____	_____
x and - Decimals	_____	_____	+ and - Fractions	_____	_____
x and - Fractions	_____	_____	Extra Credit	_____	_____
Extra Credit	_____	_____	Final Exam	_____	_____

JOB READINESS	Score	Date		Score	Date
Job Search	_____	_____	Resume	_____	_____
Application A	_____	_____	Application B	_____	_____
Application C	_____	_____	Interview	_____	_____

Applied Science & Technology
Auto Occupational Readiness
VOC/CH2 10/25/90

Name: _____

Date: _____

Safety Vocabulary Test

Write the correct definition for each word as it relates to automotive technology.

1. OSHA (Occupational Safety and Health Act of 1970 _____

_____

2. Type A Fires _____

_____

3. Type B Fires _____

_____

4. Type C Fires _____

_____

5. Airtight Containers _____

_____

6. Explosion-proof Cabinets _____

_____

7. Decibel _____

_____

8. Back Injury _____

_____

9. Carbon Monoxide _____

_____

10. Jack Stand _____

_____

Communication Skills Division -- Basic Skills Program

San Joaquin Delta College

Background:

San Joaquin Delta College has been committed to serving the basic skills needs of its students for more than a decade. From 1979 to 1984, the basic skills program, entitled "Developmental Education" was directed by the Dean of Vocational Education and offered within the Vocational Education Division. During this time the basic skills instructional program was revised and expanded into its present format. Today, basic skills instruction is offered though the Communication Skills Division.

Purpose:

The college's articulated objective for integrating basic skills into vocational education is:

> *"Preparing students to be successful in all vocational areas, and subsequently, in life."*

At San Joaquin Delta college, basic skills courses are considered "mainstream," rather than separate from academic or vocational education. Basic Skills courses serve as the bridge between the college's academic and vocational divisions. Approximately 75 percent of the 2500 basic skills students per year are concurrently enrolled in vocational programs, which creates a natural link between the Communication Skills Division and vocational education.

Description of Program:

The Communication Skills Division at Delta College oversees 10 departments, including seven basic skills departments (Academic Assessment, Applied Basic Mathematics, Basic Writing Skills, College-Wide Tutorial, English as a Second Language, Learning Disabilities, and Reading Study Skills/Memory and Thinking Skills). Students assessed as having basic skills needs (level one or two on the college-wide assessment test) are

advised to enroll in courses offered by the appropriate department. The math, writing, and reading labs are open entry and give remedial training with a vocational and life-skills emphasis. For example, a student in basic math and nursing may compute the number of ounces in a pint of blood, thus learning vocationally emphasized math. Reading and writing students may practice on bank statements or job applications.

The main teaching method used in the basic skills courses is called a "prescription". The instructor individually diagnoses the students' specific remediation needs and then prescribes the appropriate lessons based on a variety of materials reflecting alternative learning approaches specific to each student's individual learning style. Under this system, the instructors can effectively remediate students and prepare them for vocational programs.

Development:

The pilot was internally tested and funded as Developmental Education, administered organizationally under the Dean of Vocational Education. From its inception, the college incorporated the program into general funding. In 1984, the basic skills department moved to the newly created Communication Skills Division. The college decided to consolidate basic skills with Language, Literature and Arts, improving structure and coordination, and merging similar departments for cost effectiveness. The link with vocational education was continued by including vocational administrators and instructors on the basic skills committee which discussed funding issues, curriculum changes, and program changes.

Recommendations for Replication:

The college has four recommendations for replication:

- Involve key administrators in the planning to ensure common, clearly defined goals;
- Institutionalize the program to ensure funding;
- Identify personnel to be "enablers" to help students understand what the program can offer and motivate students through building self-esteem and goal settings. Assign only volunteers or new faculty and staff specifically chosen for program assignments; and

- Use tracking and follow-up studies to show effectiveness and make improvements.

Evidence of Effectiveness or Impact:

San Joaquin Delta College evaluated their basic skills program in 1985 with an outside evaluator. The evaluation called for pre-post testing and a survey of:

- Demographics, Skills Growth, Basic Skills Effects on Student Performance, Retention Rates, Self-Confidence, Assessment Scores vs. Course Selection and Performance, and Re-Entry Students.

The evaluation found significant gains in skills growth for basic skills students. The basic skills retention rates were higher than the college average for all students. Students in basic skills had a 97 percent retention rate compared to the college rate of 89 percent. The study also found that after taking basic skills courses students feelings of self-success were dramatically higher.

In 1990, the basic skills programs in reading, writing, and English as a Second Language were evaluated for 1987, 1988, and 1989.

Variables to measure student success included (1) proportionate impact; (2) semester units attempted and semester units completed; (3) remedial units attempted and remedial units completed; (4) overall units completed; (5) overall GPA; (6) the percentages of students who received a grade; (7) the percentages of students who received a W; (8) the percent of successful, those who received a credit grade excluding a W; (9) retention; (10) persistence; and (11) skill growth. The report also examines the success rate of students by ethnicity and gender.

The evaluation found significant gains in reading, writing and language acquisition for basic skills students. There was no significant disproportionate impact on students based on ethnicity or gender.

The retention rate in all programs was greater than the college-wide average retention rate. Moreover, student persistence in all programs is higher than the college-wide average. Students are also successful in college level courses for which they are concurrently enrolled.

The groundwork for further evaluations of the program was established with this initial study, and the Communication Skills Division evaluates their program every semester, producing reports for the college every third year.

Contact:

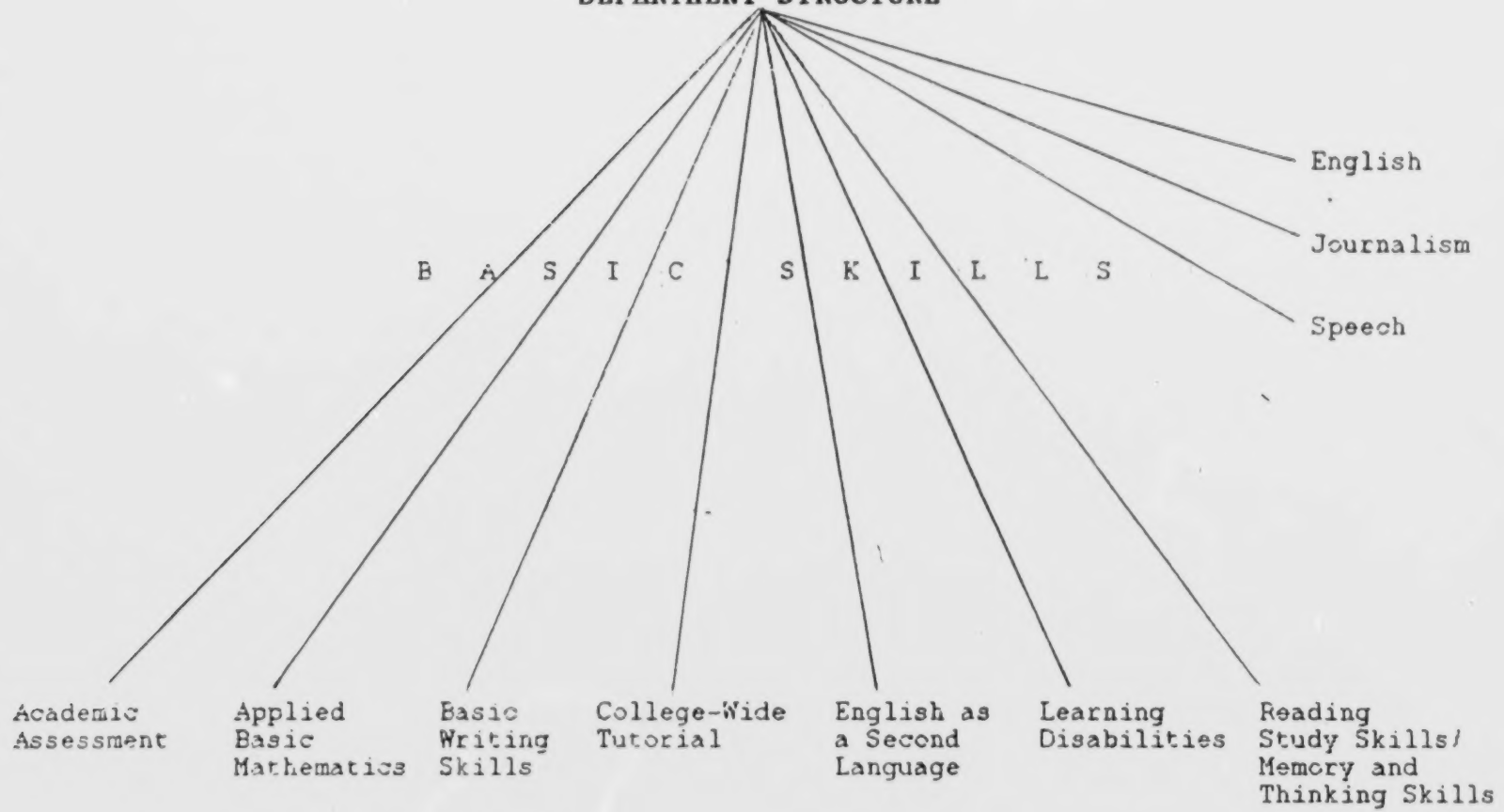
Dr. Mary Ann Cox
(209) 474-5255

Sample Materials:
San Joaquin Delta College

SAN JOAQUIN DELTA COMMUNITY COLLEGE

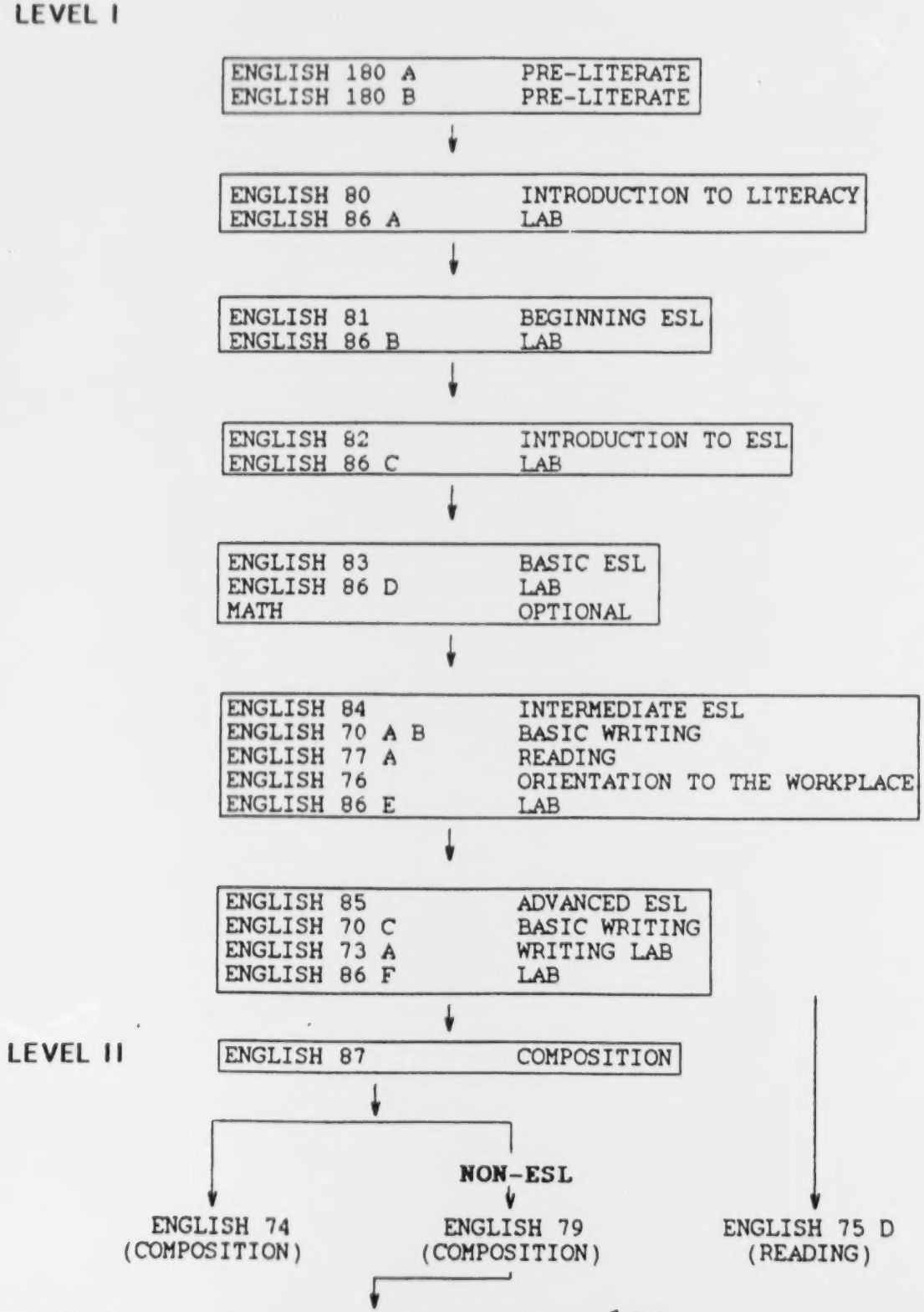
COMMUNICATION SKILLS DIVISION

DEPARTMENT STRUCTURE



BASIC SKILLS PROGRAM OVERVIEW

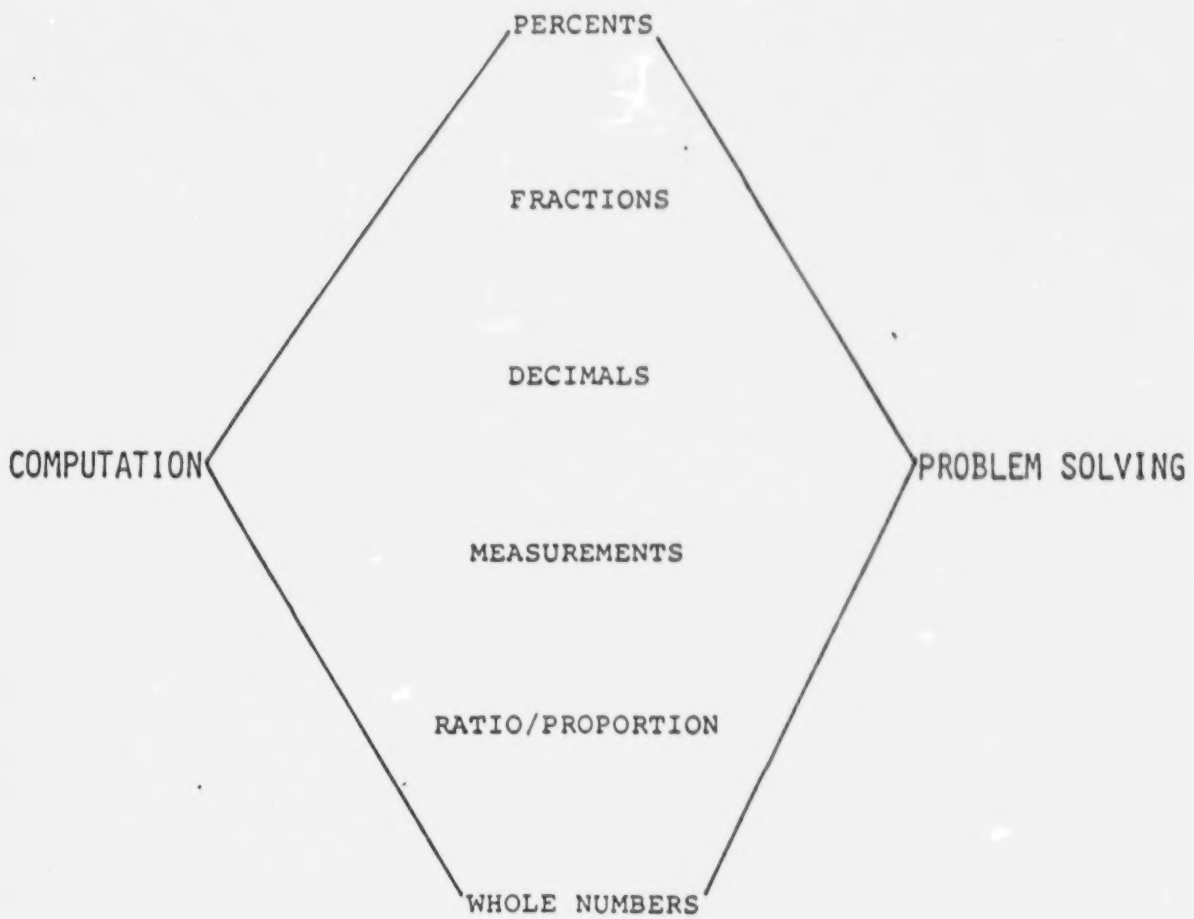
ESL PROGRAM OVERVIEW
SAN JOAQUIN DELTA COMMUNITY COLLEGE



BUSINESS
NURSING
INDUSTRIAL
AGRICULTURAL
TECHNICAL

VOCATIONAL MATH ← LEVEL II → PURE MATH

REVIEW OF ARITHMETIC
PRE-ALGEBRA
ALGEBRA



LEVEL I - APPLIED MATH PROGRAM

READING PROGRAM OVERVIEW

LEVEL I

Reading 98 G class	Below third grade
Reading 98 G, H, I, J	Lab only--through eighth grade
↓	
Reading 90 A,B	Third and fourth grade
Reading 98 A,B	Lab
↓	
Reading 90 C, D	Fifth and sixth grade
Reading 98 C, D	Lab
↓	
Reading 90 E, F	Seventh and eighth grade
Reading 98 E, F	Lab

LEVEL II (Optional)	Reading 75 D	Reading and writing techniques
	English 27	Rapid Reading
	English 33 A-G	Advanced skills
	Dv. Ed. 76	Study skills

LEVEL III (optional)	English 33 A-H	Advanced reading skills
	English 27	Rapid Reading

San Joaquin Delta College

Integration of Basic Skills and Vocational Programs

Objectives

and

Curriculum

Table of Contents

ESL
Math
Reading

ESL Level	Competency Objectives	Curriculum/Material
Eng. 84/Eng 76	**LISTENING COMPETENCIES:** The student will learn to: 1. Follow directions related to location. 2. Follow directions related to safe work procedures. 3. Interpret conversations about job applications, letter of reference, & job opportunities. 4. Interpret information about safe work procedures, wages, benefits, & work related tasks. **READING COMPETENCIES:** 1. Interpret job applications and resumes. 2. Use table of contents. 3. Interpret government forms related to seeking work such as applications for social security. 4. Identify and use information about training opportunities such as job description and job ads. 5. Interpret work safety manuals and related publications. 6. Identify procedures for reporting training and job related hazards, accidents, injuries, & damages.	1. ESL for Action Problem-Posing in the workplace 2. Azar Fundamental of English Grammar 3. It's Up to You 4. Interactions II 5. Tune in the News 6. Telephone Talk 7. Improving Oral Communication. 8. Talk about Values 9. Build Your Case
Eng. 85/Eng 76	**LISTENING COMPETENCIES:** The student will learn to: 1. Follow directions related location. 2. Follow directions related to safe work procedures. 3. Interpret conversations about job applications, letters of reference, & job opportunities. 4. Interpret information about safe work procedures, wages, benefits, & work related tasks. **READING** The student will learn to: 1. Identify appropriate skills & education for keeping a job & getting a promotion. 2. Interpret information about employee organizations. 3. Recognize standards of behavior for job interviews & select appropriate questions & responses during job interviews. 4. Interpret employee handbooks 5. Interpret tax information from articles & publications.	1. Listening In and Speaking out 2. Intermediate Listening Comprehension 3. Phrase by Phrase 4. Clear Speech 5. Elements of Pronunciation 6. The Culture Puzzle 7. ESL for Action Problem-Posing in the Workplace 8. Culturally Speaking 9. Non-Stop Discussion Workbook 10. Supplementary Materials 11. VESL

Math Level	Competency Objectives (CASAS Competencies)	Curriculum/Material (Activity/Materials)
DV.ED 86A	LISTENING COMPETENCIES: The student will learn to: 1. Add, subtract, multiply, divide, compute & interpret. 2. height and weight using standard measurements	1. Individualized worksheets for whole numbers. 2. Individualized worksheets using standard measurements.
DV.ED 86B	LISTENING COMPETENCIES: The student will learn to: 1. Add, subtract, multiply, divide with decimals inclusive of sales tax. 2. Interpret & compute wages and wage information. 3. Use and interpret various forms involving purchasing and ordering goods and services. 4. Compute and interpret information about personal & family budgets. 5. Compute perimeters.	1. Individualized worksheets for decimals. 2-4 Individualized problem-solving worksheets inclusive of problems about wages, taxes, forms and budgets. 5. Individualized worksheets for perimeters.
DV. ED. 86C	LISTENING COMPETENCIES: The student will learn to: 1. Add, subtract, multiply, divide with common and mixed fractions 2. Compute and interpret volume. 3. Compute height and weight using metric measurements.	1. Individualized worksheets for common and mixed fractions. 2. Individualized worksheets about volume 3. Individualized worksheets using metric measurements.

READING LEVELS	COMPETENCY OBJECTIVES	CURRICULUM/MATERIAL
Reading 90A,B	**LISTENING COMPETENCIES:** The students will learn to: 1. Follow directions related to location. 2. Follow directions related to safe work procedure. 3. Interpret conversations about job applications, letters of reference, & job opportunities. 4. Interpret information about safe work procedures, wages, benefits, and work related tasks. **READING COMPETENCIES:** Student will learn to: 1. Interpret job application & resumes. 2. Use table of contents.	**MCE PROGRAMS** • Following Directions • Filling Out Job Applications • Resumes Made Easy • The Fourth R • The Lost R • The Logical Process
Reading 90 C,D	**READING COMPETENCIES:** The student will learn to: 1. Interpret governmental forms related to seeking work such as applications for social security. 2. Identify & use information about training opportunties such as job descriptions & job ads. 3. Interpret work safety manuals and related publications. 4. Identify procedures for reporting training and job related hazards accidents, injuries, and damages. 5. Identify appropriate skills and education for keeping a job and getting a promotion.	**QUEUE PROGRAMS:** • Getting Paid • Step by Step Directions • Job Vacancy List • Bank statement • Job Application • Classified Ads • Want Ads • Paying taxes
Reading 90 E,F	**READING COMPETENCIES:** Student will learn to: 1. Interpret information about employee organizations. 2. Recognize standards of behavior for job interviews & select appropriate questions & responses during job interviews. 3. Interpret employee handbooks 4. Interpret tax information from articles and publications.	**LIFE SKILLS SHEETS** • Who Pays for Social Security • Your Contribution • Legal Problems and Help • Your Contributions to Social Security • Social Security Application • Making a Bank Deposit • Writing Checks • Change of Address Forms CONSUMER ECONOMICS I & II A.P.L. SERIES

COURSE PLACEMENT WORKSHEET
EFFECTIVE FALL 1990

READING

Students who score below Level II on the assessment test in reading and who intend to enroll in any course except those designated as exempt from assessment testing must enroll in an appropriate Level I reading course. The student is expected to continue enrollment in a Level I course each semester until the Level II standard is met.

ENGLISH AS A SECOND LANGUAGE
(Fulfills the Reading Requirement)

ESL students **who have** a high school diploma from the USA and who score Level I on the reading section of the assessment/placement test should follow the requirements under "Reading."

ESL students **who do not have** a high school diploma from the USA, foreign students, and all ESL students not meeting the Level I reading prerequisite must take an ESL assessment.

ENGLISH COMPOSITION

Students with a declared goal of an AA degree or transfer program must enroll in an English composition course after they complete six units of AA degree appropriate or transfer courses. Placement in English composition is dependent upon appropriate test scores or course prerequisites.

READING

LEVEL I — REQUIRED

*Reading 90A-F	—	Intro. to Reading and Language Skills
*Reading 98G-M	—	Reading Assistance Center

Students who score Level I in reading will be helped to place themselves in the correct reading course. Please go to the Assessment Center, Shima 144, or call 474-5535 for information about signing up for this **required** course.

LEVEL II & III — RECOMMENDED

*DV.ED. 74	—	Basic Spelling Skills
Eng. 27	—	Rapid Reading
Eng. 33A-H	—	Advanced Learning Skills
Eng. 75D		Reading and Writing Techniques

COMPOSITION

LEVEL I — REQUIRED FOR A.A. DEGREE OR TRANSFER PROGRAM

*Eng. 70A-C	—	Basic Writing Skills		
Eng. 70	—	Basic Writing Skills	Eng. 70A☐	Eng. 70B/C☐

LEVEL II — REQUIRED FOR A.A. DEGREE OR TRANSFER PROGRAM

Eng. 79	—	Preparatory for English 1A
Eng. 79L	—	Preparatory for English 1A and Lab

RECOMMENDED

Eng. 72	—	Technical Writing (For Vocational A.A. Degree and Certificate Programs)
*Eng. 73A, B	—	Writing Lab
Eng. 87	—	Intermediate Writing (Prepares for enrollment in English 79)

**Units earned in these courses do not count toward the associate degree.*

LEVEL III — REQUIRED FOR A.A. DEGREE OR TRANSFER PROGRAM

Eng. 1A	—	Written Communications

RECOMMENDED

*Eng. 73A, B	—	Writing Lab

MATHEMATICS

Some of the following courses may have prerequisites other than test scores. Previous course work may qualify you for some math classes.

LEVEL I — RECOMMENDED

*DV.ED. 86A-D	{	Applied Math
*DV.ED. 78A-P	{	Applied Math Lab
*DV.ED. 87A, B	—	Survival Math
*V.N. 97A-D	—	Basic Skills for Health Occupations

LEVEL II — RECOMMENDED

Ag. Bus. 13	—	Ag. and Natural Resource Math
Bus. 82A	—	Business Math
Elect. 79	—	Electronic Math
H.S. 33	—	Applied Math in Nursing
Indus. 94A	—	Industrial Math
*Math 72	—	Review of Arithmetic
Math 75	—	Topics in Math
*Math 79	—	Pre Algebra
Math 80	—	Elementary Algebra
Math 83A/B	—	Elementary Algebra

LEVEL III — RECOMMENDED

Bus. 82B, C	—	Business Math

ADDITIONAL MATH COURSES

Refer to the class schedule for specific prerequisites.

Math 1, 2, 3, 4, 5, 10, 12, 13, 15, 17A, 17B, 20, 36, 41, 42, 43, 44, 45, 50H, 51, 81, 82, 84A/B, 87, Psych. 12

SUPPORT COURSES

Guid. 100	Preregistration Orientation
Guid. 10	Orientation to College
Guid. 30	Career Self Assessment
Eng. 33G	Human Learning and Thinking Skills
Eng. 33E	Study Skills for Success in College

**Units earned in these courses do not count toward the associate degree.*

Students may take the Assessment/Placement test one time. Challenge tests are available through the Assessment Center. Further appeals may made through the appeals process, contact the Dean of Student Services, Locke 126.

3-90

READING 98 PRESCRIPTION SHEET

NAME _____ SS# _____

READING LEVEL _____ LAB ASSIGNMENT SHEET# _____

TEACHER _____

SDRT Reading Score _____ Modality _____

Other _____

COMPREHENSION

Facts/Details

1. Sound Filmstrip Package
   9602 Finding Details, A
2. Specific Skills Series
   Following Directions Bk _____
   Locating the Answers Bk _____
   Getting the Facts Bk _____
3. Multiple Skills Series
   _____-1, _____-2, _____-3, _____-4

Main Idea

1. Sound Filmstrip Package
   9601 Finding the Main Idea, A
2. Specific Skills Series
   Getting the Main Idea Bk _____
3. Cassette Learning Package
   9162 Determining the Main Idea

Sequence

1. Sound Filmstrip Package
   9603 Determining the Sequence
2. Specific Skills Series
   Detecting Sequence _____
3. Cassette Learning Package
   9164 Cueless Sequence

Fluency

Controlled Reading Study Skills

AA _____

AB _____

Combining Skills

Multiple Skills Series

B1 C1 D1 E1

B2 C2 D2 E2

B3 C3 D3 E3

B4 C4 D4 E4

Reasoning

1. Sound Filmstrip Package
   9604 Drawing Conclusions, A
   9605 Predicting Outcome, A
2. Specific Skills Series
   Drawing Conclusions Bk _____
   Identifying Inferences BK _____
3. Cassette Learning Package
   9168 Let's Reason Together
   9169 Milk and Hard Work
4. Read and Reason

Vocabulary in Context

COMMENTS: _____

_____

_____

_____

_____

_____

Name _____
Course _____
Instructor _____

Interesting Articles

Directions:

1. Select an article of interest to you.
2. Read the article.
3. Answer the following questions.

Questions:

1. What is the title of the article?
2. What is the main idea of the article?
3. Give two supporting details.
   a. _____

   b. _____

4. Tell one thing you learned from the article.

5. Write down at least two vocabulary words from the article that are new to you. a. _____ b. _____

6. Look the new words up in the dictionary and give their meanings.
   a. _____

   b. _____

7. Read the article aloud to a friend and have your friend sign here. _____

LEARNING STYLE PREFERENCE FORM Name_____

Place a check on the appropriate line after each statement.

		OFTEN	SOMETIMES	SELDOM
1.	I can remember more about a subject through listening than through reading.	____	____	____
2.	I follow written directions better than oral directions.	____	____	____
3.	I need to re-read things I write down down so that I can remember.	____	____	____
4.	I can write with a sharp pencil without breaking the point.	____	____	____
5.	I require explanations of diagrams, graphs, or visual directions.	____	____	____
6.	I enjoy working with tools.	____	____	____
7.	When I am learning about something, I will use graphs and charts to better understand the topic.	____	____	____
8.	I like to have stories read to me.	____	____	____
9.	I remember best by writing things down several times.	____	____	____
10.	I can understand and follow directions on maps.	____	____	____
11.	I do better at academic subjects by listening to the teacher or tapes.	____	____	____
12.	I learn such things as boating, roller skating, or riding a bike.	____	____	____
13.	I learn to spell better by repeating the letters out loud than by writing the word on paper.	____	____	____
14.	I can better understand a news article by reading about it in the paper than by listening to the radio.	____	____	____

LAB PRESCRIPTION
Lynne Swanson, Instructor
SPRING, 1991

STUDENT NAME_____SS#_____

MCE.

Have initialed when completed.

Following Directions _____
Filling Out Job Applications _____
Resumes Made Easy _____
The Fourth R _____
The Lost R _____
The Logical Process _____

QUEUE PROGRAMS.

Step by Step Directions _____
Job Vacancy List _____
Bank statement _____
Job Application _____
Classified Ads _____
Want Ads _____

LIFE SKILLS SHEETS.

Who Pays for Social Security _____
Your Contribution _____
Legal Problems and Help _____
Your Contributions to Social Security _____
Social Security Application _____
Making a Bank Deposit _____
Writing Checks _____
Change of Address Forms _____

Vocational Training Center Literacy Laboratory

Fresno City College

Background:

Fresno City College's Vocational Training Center offers short-term non-credit job training programs. The philosophy of the Center is to train students in a particular vocation and get them employed. Seventy percent of the students at the Vocational Training Center are JTPA clients, and many more are GAIN recipients.

When JTPA "8 percent" monies became available five years ago, the Vocational Training Center established a literacy lab to provide basic skills instruction in conjunction with vocational training. The literacy lab was established at the Center to provide the extra basic skills instruction frequently needed by these populations. With the loss of JTPA funds, the program has become defunct. Despite its loss of funding, however, the literacy lab program is an example of the successful integration of vocational and basic skills education.

Purpose:

The purpose of the literacy lab was to improve students' skills in those areas needed for the courses/jobs pursued. The lab curriculum was designed to bring students to the minimum skill levels required to complete the training program, obtain and keep a job.

Description of Program:

The literacy lab was designed to serve students with marginal basic skills, based on their scores on a standardized reading assessment instrument. A sliding scale of minimum scores was developed based on the skills required for each training program. For instance, a 6th grade reading level was required for Body and Fender students while an 8th grade level was required for those in the Body Maintenance program. Students who scored much lower than "marginal" were referred to the Fresno Adult School. From 8 to 15 students were served by the lab at any one time.

Those identified for literacy lab instruction were required to attend the lab for a minimum of 2 hours per week either before or after their training classes. Students assigned to the learning lab were required to sign a contract that committed them to the 2 hour per week minimum. The basic skills instruction offered in the lab was job-specific.

The reading materials used there were drawn from shop manuals, and the mathematics functions taught were limited to those used in the shop; the mathematics functions included measurement skills.

The Center is a completely non-credit facility, and students do not earn college credit for vocational training programs or literacy lab instruction.

Development:

The director of the Vocational Training Center took responsibility for obtaining the 8 percent monies, envisioning the system, and acting as a catalyst for the program. The realization of the literacy lab itself, however, was a cooperative effort that involved the input of all the Center staff as well as local PIC and GAIN representatives.

Vocational faculty at the Center worked with the basic skills teacher who was hired to run the lab. Together, they identified the skills to teach and the language to use, as well as sources of materials. A great deal of time was invested by the vocational instructors in articulating their needs and helping the basic skills instructor design appropriate and effective responses.

The director of the Center, as well as his staff, are well-acquainted with individuals at the local PIC as well as county GAIN staff. Representatives from these agencies offered on-going support and input in the development of the learning lab. Their support has also been crucial in the expansion of offerings at the Center.

Since the Center is a non-credit facility, obtaining course approval is not a cumbersome process.

Recommendations for Replication:

The staff at the Center feel that their model could be replicated at other colleges, and invite inquiry from other college staff who are considering initiating a similar program. They also suggest a 3-year timeline for development, in which the first year would be devoted to developing and refining the curriculum, the second year to pilot the program with students, and the third year to measure its impact.

Contact:

Richard Cristl
(209) 486-0173

Sample Materials:
Fresno City College

Sample materials from Fresno City College's Vocational Training Center Literacy Lab are currently unavailable. For more information, please contact the college directly.

Applied Mathematics Career Programs: A Curriculum Development Model

Los Medanos College

Background:

Los Medanos College staff strongly support integrating all educational programs, including academic and vocational instruction. In 1984, the college developed the Math 10 course, which integrates mathematics instruction within technical principals of four vocational areas: Health Science, Business/Secretarial, Vocational Technical fields, and Consumer Homemaking.

Los Medanos College previously offered a single Basic Math Skills Course for both educational requirements of students and constrained fiscal reasons. After eight years, facing low retention rates and classes of uninterested students, the math department decided to redirect the course from a "pure math" approach to that of an "applied math" approach. Pursuant to a proposal for funding of the "Applied Mathematics Career Programs: A Curriculum Development Model", Los Medanos College received a $6,000 grant from the California Community Colleges Fund for Instructional Improvement. The program was funded in the 1983-84 school year, and the complete integrated math course was offered to students beginning in spring 1984.

In order to adequately prepare students to function in and contribute to a high-tech society, it is necessary to give students a sound mathematical base. To achieve this, the new curriculum incorporates relevancy with respect to everyday situations and desired vocational options. The new curriculum also increases student retention, in particular for non-traditional students, and improves access to higher levels of mathematics by improving students' arithmetic competency. This non-traditional curriculum course fulfills the college's competency requirement in a cost-effective manner; the career applications of basic math skills are offered within the context of one umbrella course.

Program Description:

The Math 10 Course incorporates an individualized, self-paced learning system that has an applications focus, rather than a "pure math" approach. The curricular design is "tree-like"; it has a common course that functions as the "trunk" and offers four "branch" options. The math competencies for the core portion of the course were determined by the math faculty subsequent to reviewing input from vocational instructors regarding the basic math skills necessary to succeed in first level courses. All enrolled students complete the first set of modules that cover a basic math skills review.
After completion of the core section, students then choose a career-specific application module. There are four options: Health Science, Business/Secretarial, Vocational-Technical, and Consumer Math. The different areas share a common core with branching options to treat the specific and differing demands of each application.

A module of exercises and tests was developed for each section by math faculty. The instructional modules support material covered in the textbooks for each branch. The student is responsible for progressing through the course material by completing a series of modules at his/her own pace. A readiness test is given and if the student and instructor believe mastery has been achieved, the student progresses to the next unit. If mastery has not been accomplished, the instructor directs the student to materials which will be of assistance to achieve mastery. The college also reported that math anxiety has been reduced overall, because the students are able to progress at their own speed and are able to retake tests on sections with which they do not feel comfortable.

Additionally, the tutoring component of the course ensures that all students will receive adequate attention and assistance, often not available in a traditional classroom setting. The instructor and student tutors are available in the classroom to assist with completion and mastery of modules. Students spend three hours per week in regularly scheduled class meetings and an additional two hours per week in the math tutorial center.

The student earns three units of credit that satisfy the Los Medanos College Math Proficiency requirement. The student may repeat the class for up to 5.5 units of credit by pursuing two fields of application. These units are transferable to the California State University system.

Development:

Although the impetus for the program came from the Math Department, the Vocational Education department provided input and feedback on

applications course content and module structure. The inter-departmental approach of the course design allowed for different departments to cooperate in finding the best presentation of the materials. With an integrated course such as this, career-education instructors found they could accomplish more within their respective courses. Also, the math faculty expanded their horizons from that of pure mathematics.

Recommendations for Replication:

- College staff highly recommend the use of trained student tutors to assist in the self-paced course. The tutors at Los Medanos are trained in the mathematical principles taught in Math 10, as well as how the principles work across the various vocational curricula.

- Secondly, both math and vocational instructors reported that writing their own specialized modules helped to alleviate the continual search for appropriate and up-to-date textbooks to some extent. Because the vocational fields are constantly changing with new technological advances, frequent textbook changes occur. But the modules allow the staff to respond to the textbook changes quickly, and to extract information that the instructors deem to be most appropriate for student skill development.

- Finally, staff recommend that other colleges determine a formula for on-going communication. Frequent communication is especially needed when refinements may be necessary or when new course materials are added.

Evidence of Effectiveness or Impact:

The project has had significant impact on the improvement of instruction, not only within the math area but also for the career education area for which this innovative course and its associated support activities are designed to serve. This is exemplified by the student successes. There was a dramatic increase in the percentage of satisfactory completers (from 47% to 60%), that is, students receiving an A, B, or C grade in the "applied math" course compared to the "pure math" course. There has also been a significant increase in demand for the areas of Business and Vocational-Technical; student enrollment increased when previously there was little or none.

Under this program, the creation of a two term student/peer tutorial training program allowed for an immense and favorable impact upon the quality of tutorial support services. The tutors helped the students overcome math anxieties and also became an integral component of the support system that is vital to student retention.

Student evaluations of the program have been strong. The course materials designed have been useful for helping students to understand the material in each unit. Also, the individually paced and supportive environment has been praised by the students.

Contact:

Stanley Chin
(415) 798-3500
ext. 204

Sample Materials:
Los Medanos College

LOS MEDANOS COLLEGE

I. COURSE TITLE: MATH 10 UNITS 1-3½
INSTRUCTIONAL MODE: Three hours P.S.I., two hours laboratory

PREREQUISITES: None

II. Catalog Description:

Applications of mathematics for career education programs in an individualized, mastery-based, tutorial setting. This course will provide theory and application of mathematics to one of the following fields of the student's choice: 1) consumer education; consumer-related topics such as buying, borrowing, saving, taxes, and concepts from statistics; 2) nursing and pharmacology; allied health-related topics such as percent and preparation of solutions, dosage calculations, conversions, and medical abbreviations; 3) business; includes topics such as interest, discount, payroll, and employment tests; 4) technical/vocational; includes topics related to layout, constructions, engines, and electronics. All of the above areas include use of calculators, computers, and instruction in metric system. Three units of MATH 10 satisfies the LMC math proficiency requirement. May be repeated for up to 5.5 units of credit by pursuing two fields of application.

Transferability: CSUC

Schedule Descriptor:

Self-paced instruction in Basic Skills Review and application of arithmetic to the following fields: Consumer, Nursing and Pharmacology, Business and Vocational/Technical. Review may be challenged. Three units satisfy LMC Math Proficiency requirement.

III. Overview and Rationale:

Math 10 is an individualized course designed to improve persons' skills in any and all areas of arithmetic in which the person desires competency. It is further designed for persons who are going to apply arithmetic skills to majors in the areas of Consumer, Nursing and Pharmacology, Business and Vocational/Technical. It is imperative in today's society for everyone to be able to handle the basic manipulative skills of arithmetic, to have some understanding of percents, and to be familiar with the metric system of measurement. Our society is a mathematically oriented one in that almost everything at one time or another is interpreted in numerical terms.

IV. Goals:

A. To improve an individual's arithmetic competency.

B. To make it possible for an individual to use arithmetic in everyday situations.

C. To allow an individual to apply arithmetic in their major course of study within the fields of Consumer, Nursing and Pharmacology, Business, and Vocational/Technical.

D. To allow an individual to pursue a career that requires arithmetic competency.

V. Objectives:

The student will be able to:

A. Understand place value.

B. Read and write numbers.

C. Add, subtract, multiply, and divide whole numbers, fractions, and decimal numbers.

D. Understand some of the fundamental properties of addition, subtraction, multiplication, and division.

E. Understand prime and composite numbers.

F. Find the greatest common divisor and the least common multiple.

G. Understand a fraction and how to reduce fractions.

H. Use mixed numerals.

I. Understand and use decimal fractions.

J. Round off numbers.

K. Use arithmetic to solve practical applications from the Fields of Applications: Consumer, Business, Nursing and Vocational/Technical.

VI. Content:

I. BASIC SKILLS REVIEW (1 unit)

A. Module 0 PSI, Course Policies and Procedures

B. Module 1 Reading, Writing, Adding and Subtracting Whole numbers

C. Module 2 Multiplication and Division of Whole Numbers

D. Module 3 Factoring, Exponents, Square Roots

E. Module 4 Equivalent Fractions, Multiplication and Division of Fractions

F. Module 5 Addition and Subtraction of Fractions

G. Module 6 Review - Whole Numbers and Fractions

COURSE CONTENT (continued)

H. Module 7 Addition and Subtraction of Decimals

I. Module 8 Multiplication and Division of Decimals Decimal Fractions

J. Module 9 Cumulative Review - Final Exam

II. MATHEMATICS FOR CONSUMER (unit 2)

A. Module 10C Multiples of 10, Sales tax, Discounts

B. Module 11C Cash and Trade Discounts

C. Module 12C Basic Measurement Problems

D. Module 13C Checking Accounts

E. Module 14C Review of Modules 10C-13C

F. Module 15C Interest

G. Module 16C Your Paycheck - Wages

H. Module 17C Your Paycheck - Deductions

I. Module 18C Review of Modules 10C-17C, Final Exam - 1 unit of credit

J. Module 19C Income Taxes

K. Module 20C Insurance: Fire, Auto, Life

L. Module 21C Installment Buying

M. Module 22C Profit, Loss, and Depreciation

N. Module 23C Review of Modules 19C-22C

O. Module 24C Owning a Home

P. Module 25C Statistical Graphs and Averages

Q. Module 26C Using the Metric System

R. Module 27C Review of Modules 19C-26C, Final Exam - 1 unit of credit

III. MATHEMATICS FOR BUSINESS

A. Module 10B Using the Calculator; the Metric System

B. Module 11B Bank Records

C. Module 12B Percent

D. Module 13B Review of Modules 10B, 11B, 12B

E. Module 14B Payroll

F. Module 15B Mathematics of Buying

G. Module 16B Mathematics of Selling

H. Module 17B Review of Modules 10B-16B, Final Exam - 1 unit of credit

COURSE CONTENT (continued)

I. Module 18B Simple Interest
J. Module 19B Compound Interest and Annuities
K. Module 20B Business and Consumer Loans
L. Module 21B Review of Modules 18B, 19B, 20B
M. Module 22B Taxes and Insurance
N. Module 23B Depreciation and Business Statistics
O. Module 24B Financial Statements
P. Module 25B Review of Modules 18B-24B, Final Exam - 1 unit of credit

IV. TECHNICAL APPLICATIONS

A. Module 10 Percents
B. Module 11 Application of Percents
C. Module 12 Exponents and Square Roots
D. Module 13 Formula Evaluation
E. Module 14 Review of Modules 10-13
F. Module 15 Formula Transposition
G. Module 16 Ratio and Proportion
H. Module 17 Review of Modules 10-16, Final Exam - 1 unit of credit
I. Module 18 Measurement and Graphing
J. Module 19 Conversions and English System of Measurement
K. Module 20 Introduction to Geometry
L. Module 21 Review of Modules 18-20
M. Module 22 Plane Geometry
N. Module 23 Solid Geometry
O. Module 24 Metric System
P. Module 25 Review of Modules 18-24, Final Exam - 1 unit of credit
Q. Module 26 Fundamentals of Trigonometry
R. Module 27 Solution of Right Triangles
S. Module 28 Applications of Right Triangle Trigonometry
T. Module 29 Review of Modules 26-28, Final Exam - ½ unit of credit

COURSE CONTENT (continued)

V. MATHEMATICS OF NURSING AND PHARMACOLOGY

A. Module 10N Ratio, Proportion, Dimensional Analysis
B. Module 11N Percent and Preparation of Solutions
C. Module 12N Metric System: Weight and Measure
D. Module 13N Review of Modules 10, 11, and 12
E. Module 14N Apothecaries' and Household Systems
F. Module 15N Conversions and Medical Abbreviations
G. Module 16N Review of Modules 10 through 15
H. Module 17N Tablets, Capsules, Oral solutions
I. Module 18N Injectable Drugs in Solution
J. Module 19N Intravenous Fluids and Medication
K. Module 20N Review of Modules 17, 18, and 19
L. Module 21N Insulin and Heparin
M. Module 22N Pediatric and Geriatric Dosages
N. Module 23N Electrolyte Solutions
O. Module 24N Review of Modules 17-23

VII. Activities:

The student is responsible for progressing through the course material. The instructor and student tutors are available to assist the student in any way possible. The student studies a unit until the student feels proficient. a readiness test is given and if the student and instructor believes mastery has been achieved the student progresses to the next unit. If mastery has not been accomplished, the instructor directs the student to materials which will be of assistance to achieve mastery.

VIII. Materials:

A. TEXTS:
   1. A Handbook of Basic Math With Application by Zant
   2. Mathematics for Nurses by Miller
   3. Clear and Simple Guide to Business Math by Meyer
   4. Business Mathematics by Miller and Salzman
   5. Technical-Vocational Mathematics

B. Module books to accompany the texts.
C. Handouts of various practical applications.
D. Various supplementary text materials to assist students over difficult areas.

IX. Evaluation:

A. Completion of modules.

B. A final exam on the first nine units for 1 unit of credit.

C. A final exam on ½ of a field of application for 2 units.

D. A final exam on an entire field of application for 3 or 3½ units.

Course grade determination:

See Module 1 (first-day handout) for grade determination.

X. Policies:

Every student is expected to meet with the instructor and/or the student tutor during the three regularly scheduled class hours per week. They are also expected to attend the math tutorial center for an additional two hours per week. This time is to be used to continue discussing difficulties with the instructor and/or student tutors.

XI. Course Evaluation:

XII. Course Outline Activity Log (Dates course is developed and/or revised and names of staff involved):

COURSE ORIGINATION

DEVELOPED BY: _____ DATE: _____

CLUSTER PERSONS RECOMMENDATION - DATE: _____

PRESIDENT'S APPROVAL - DATE: _____

REGULAR BIENNIAL REVIEW

STAFF: DATE:

MAJOR REVISIONS

STAFF: DATE:

DISCONTINUED: DATE: _____

CW/taf
10/8/86
A374
ap03028703

APPLICATIONS OF RIGHT TRIANGLE TRIGONOMETRY

MODULE 28T

In this module, you will have the opportunity to apply the skills you have developed in solving right triangles to applied problems.

OBJECTIVE

When you have successfully completed this module, you will be able to solve applied problems requiring use of right triangle trigonometry.

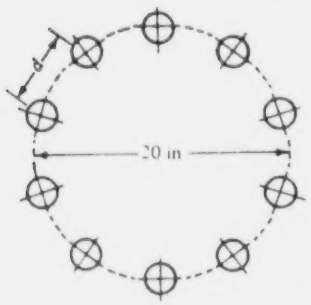
PROCEDURE

1. Read pages 257-259 in your text.

2. Work Exercise 16-5 on pages 259-262.

3. Work the exercises below.

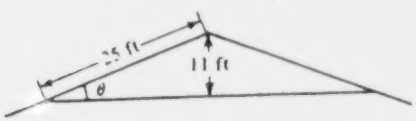
   a) Ten bolt holes are equally spaced on the circumference of a circle. If the diameter of the circle is 20 inches, what is the distance d between the centers of two adjacent holes?



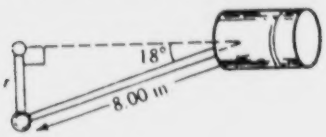
   b) Nine holes (equally spaced) are to be drilled in a steel plate on the circumference of a circle which has a diameter of 12 inches. What will be the distance between the centers of any two adjacent holes?

   c) Two points on the circumference of a wheel are 24 centimeters apart. The diameter of the wheel is 60 centimeters. What is the size of the angle formed by two radii to the two points?

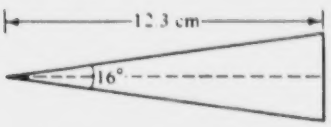
   d) The length of a roof rafter from the wall to the peak (without the overhang) is 25 feet, and the rise of the roof at the peak is 11 feet. What is the pitch of the roof (angle θ) to the nearest degree?



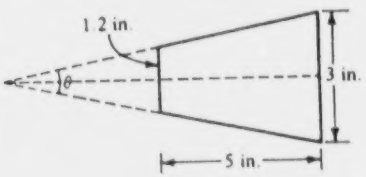
e) An engine has piston connecting rods 8.00 inches in length, and the maximum angle each rod makes with the line of center from the crankshaft to the piston is 18°. What is the length of the radius (r) of the crankshaft throw in this engine to the nearest hundredth of an inch?



f) A wedge, 12.3 cm in length, has a taper of 16°, as shown in the figure. What is the minimum width of stock material needed to make this wedge?

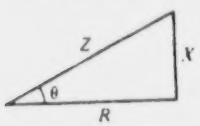


g) Find the angle (θ) of the taper for the piece of milled stock shown in the figure. Give the answer to the nearest 5' of a degree.

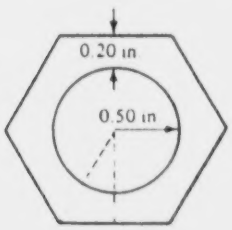


h) A guy wire 600 feet long is attached to a television antenna 430 feet above ground level. What angle does the wire make with the antenna, to the nearest 5' of a degree?

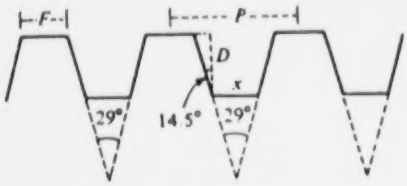
i) In alternating current circuits, the relationship between the resistance R (in ohms), the reactance X (in ohms), the impedance Z (in ohms), and the phase angle θ is represented by a right triangle. If the resistance is 530 ohms and the impedance is 720 ohms, what is the phase angle to the nearest 10' of a degree?



j) A hexagonal nut is to be constructed to fit a 1-inch bolt. The minimum wall thickness is to be 0.20 inch. What is the minimum diameter, to the nearest hundredth of an inch, of cylindrical stock material that can be used to make this nut?

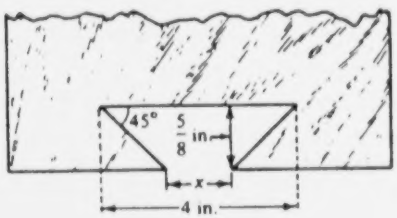


k) The figure shows a cross section of a gear track. Find the length x when P = ½ in, D = 0.26 in, and F = 0.18 in.

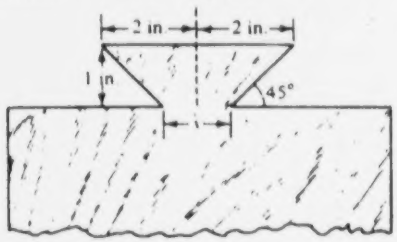


l) Using the figure in Exercise k above, find the length of x when P = ¼ in, D = 0.16 in, and F = 0.04 in.

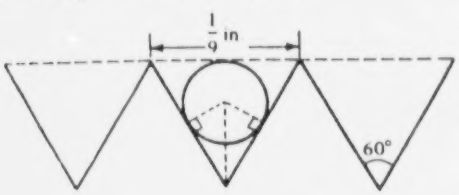
m) The strongest joint a carpenter can use to fasten two boards together is called a dovetail joint. The mortise, or opening, of a dovetail is shown in the figure. What is the length of x in this mortise?



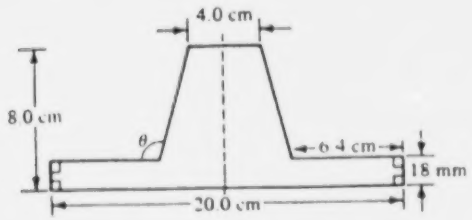
n) A tenon shaped like a wedge is designed to interlock with a mortise of the same size to form a dovetail joint. What is the length of y in the tenon shown in the figure?



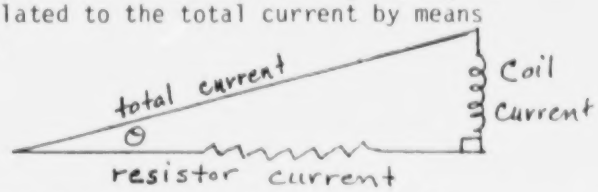
o) A machinist uses a method for gauging screw threads which involves finding a wire of proper size so that it will be flush with the top of the thread when placed in a thread groove. The figure shows a cross section of a screw thread. What is the diameter of the wire that will be flush with the top of the thread?



p) A design for a metal casting is shown in the figure. What is the measure of angle θ, to the nearest 5' of a degree?



q) The current flowing through a resistor and the current flowing through a coil in a parallel circuit may be related to the total current by means of the current triangle shown below.



Find θ if the total current is 12 amperes and the current through the coil is 10 amperes. Find the resistor current.

r) Using the triangle in q, find θ and the coil current if the resistor current is 24A and the total current is 32A.

PROCEDURE (continued)

4. Work the practice test included in this module.

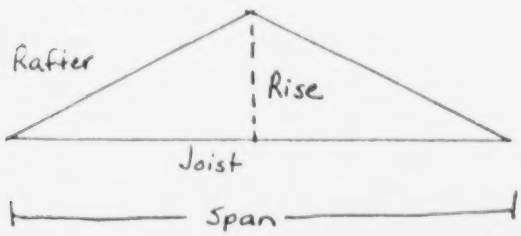
5. Ask for the Module 28 test.

MODULE 28 PRACTICE TEST

1 - 3. Use problems 13, 14, and 15 from the Chapter 16 Test on page 264.

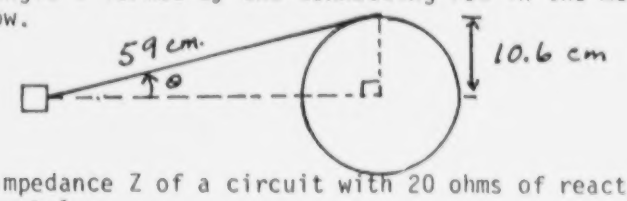
4. According to government specifications, the incline of a particular stretch of freeway should be 4.3^{0}. How much rise would there be in a 4-mile section built at a 4.3^{0} incline?

5. Find the angle a rafter makes with a joist of a house if the rise is 12 ft and the span is 30 ft.

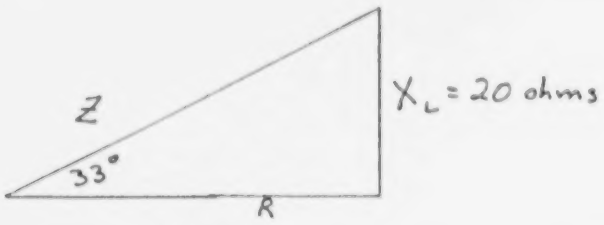


6. Find the length of the rafter in problem 5.

7. Find the angle θ formed by the connecting rod in the mechanical assembly shown below.



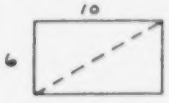
8. Find the impedance Z of a circuit with 20 ohms of reactance X_L represented by the diagram below.



Answers

Exercise 16-5, pages 259-262

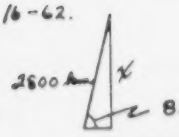
16-61.



$d = \sqrt{10^2 + 6^2}$

$= 10.77$ ft.

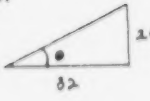
16-62.



$\sin 82.5° = \frac{x}{2800}$

$x = 2776$ ft

16-63.

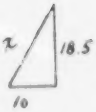


$\tan\theta = \frac{20}{32}$

$= .6250$

$\theta = 32°$

16-64.



$x = \sqrt{(18.5)^2 + (10)^2}$

$= \sqrt{342.25 + 100}$

$= 21.0$ ft

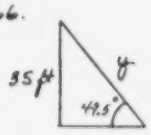
16-65.

$\sin 45° = \frac{2.8}{x}$

$x = \frac{2.8}{\sin 45°}$

$= 3.96$

16-66.



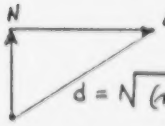
$\sin 49.5° = \frac{35}{y}$

$y = \frac{35}{\sin 49.5°}$

$= 46.028$

$= 46$ ft

16-67.



$d = \sqrt{(n)^2 + (e)^2}$

$= \sqrt{(125)^2 + (80)^2}$

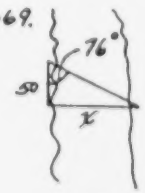
$= 148.4$ miles

16-68. $\tan 32°40' = \frac{?}{.5 \text{ miles}}$

$.5(\tan 32°40') = ?$

$? = .32$ miles

16-69.



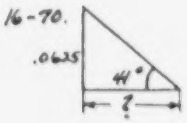
$\tan 76° = \frac{x}{50}$

$50(\tan 76°) = x$

$x = 50(4.0108)$

$= 200.54$ ft

16-70.



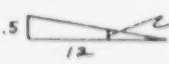
$\frac{.375 - .25}{2} = .0625$

$\tan 41° = \frac{.0625}{?}$

$? = \frac{.0625}{\tan 41°}$

$? = .0719$

16-71.

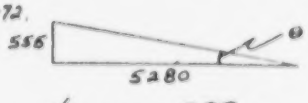


$\tan\theta = \frac{.5}{12}$

$\theta = 2°23'$

$\approx 2.4°$

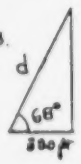
16-72.



$\tan\theta = \frac{555}{5280}$

$\theta = 6°$

16-73.



$\cos 68° = \frac{380}{d}$

$d = \frac{380}{\cos 68°}$

$= 1014.4$ ft

16-74. $s = \sqrt{(17)^2 - (8)^2}$

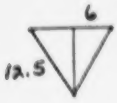
$= 15$

$V = \ell w h = (15)(8)(11) = 1320$ units^3

16-75.

$h_1 = \sqrt{(12.5)^2 - 5^2}$

$= 11.456$



$h_2 = \sqrt{(12.5)^2 - 6^2}$

$= 10.966$

$A_1 = \frac{1}{2} b h_1$

$= \frac{1}{2}(10)(11.456)$

$= 57.280$

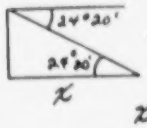
$A_2 = \frac{1}{2} b h_2$

$= \frac{1}{2}(12)(10.966)$

$= 65.796$

12 cm

16-76.



$\tan 24°20' = \frac{1}{x}$

$x = \frac{1}{\tan 24°20'}$

$= 2.211$ miles

16-77.

$\sin 36° = \frac{x}{8}$

$8 \sin 36° = x$

$x = 4.7023$

$S = 2x$

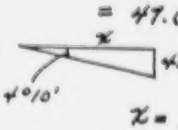
$S = 2(4.7023)$

Length of fence $= 5S$

$= 5(9.405)$

$= 47.023$ ft.

16-78.



$\tan 4°10' = \frac{45}{x}$

$x = \frac{45}{\tan 4°10'}$

$= 617.7$ ft.

16-79.

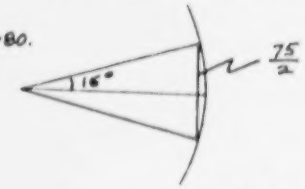
$\sin 30° = \frac{?}{4}$

$4(\sin 30°) = ?$

$? = 2$

radius $= 2$ cm

16-80.



$\sin 15° = \frac{37.5}{r}$

$r = \frac{37.5}{\sin 15°}$

$= 144.9$ ft

Procedure 3 exercises

a) 6.18 in b) 4.1 in c) 47.2° d) 26° e) 2.47 in f) 3.46 in

g) 20.4° h) 44.25° i) 42.7° j) 1.62 in k) .186 in l) .127 in

m) 2.75 in n) 2 in o) .064 in p) 104.5° q) $\theta = 56.3^\circ$; 6.7 amperes

r) $\theta = 41.4^\circ$; 21.2 amperes

Practice Test answers

1. 23.3° 2. 4.27 in 3. 1.06 in 4. .3 mile 5. $\theta = 38.5^\circ$

6. 19.2 ft 7. 10.5° 36.7 ohms

Vernier and Dial Calipers. Vernier calipers, figure 7, and dial calipers, figure 8, are widely used in the metal trades. The most common English unit lengths are 6 inches and 12 inches, although calipers are available in up to 72-inch lengths. The smallest unit that can be read is 0.001 inch. Metric measure rules are available in lengths from 150 millimetres to 600 millimetres. The smallest unit that can be read is 0.02 millimetre. Some vernier calipers are designed with both English and metric unit scales on the same instrument.

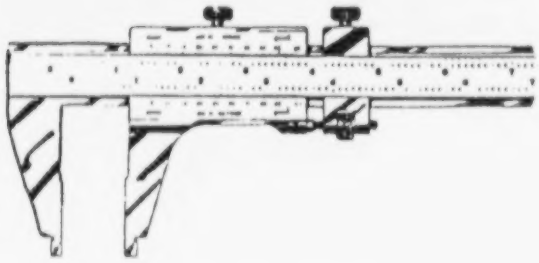


Figure 7 Vernier Caliper

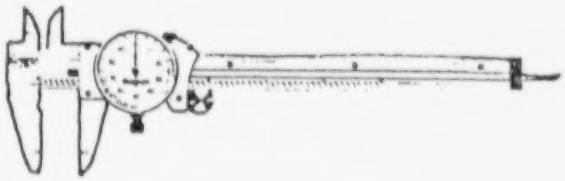


Figure 8 Dial Caliper

Micrometers. Micrometers, figures 9 and 10, are used by tool and die makers, automobile mechanics, and inspectors. Micrometers are used when relatively high precision measurements are required. There are many different types and sizes of micrometers. English outside micrometers are available in sizes from 0.5 inch to 60 inches. The smallest graduation is 0.000 1 inch with a vernier attachment. Metric outside micrometers are available in sizes up to 600 millimetres. The smallest graduation is 0.002 millimetre with a vernier attachment.

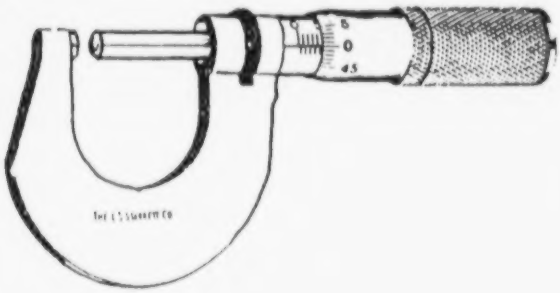


Figure 9 Metric outside micrometer

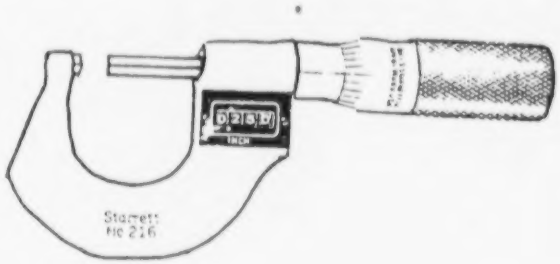


Figure 10 English digital outside micrometer

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TRANSFER AND COMPARISON MEASUREMENT

Tapes, rules, calipers, and micrometers are direct measurement instruments. Measured lengths are read directly on these instruments. It is sometimes not practical or possible to read a measurement directly. Measurements can then be made by transfer or comparison instruments.

Calipers, dividers, and trammels are transfer measuring instruments. Dial indicators, gage blocks, and high amplification comparators (mechanical, optical, pneumatic and electronic) are comparison measuring instruments. These instruments are available in a variety of types and dial graduations. Dial indicators are available with graduations as small as 0.000 05 inch and 0.002 millimetre. Gage blocks are accurate to 0.000 002 inch and 0.000 06 millimetre. Some transfer and comparison measuring instruments are shown in figures 11 through 16.

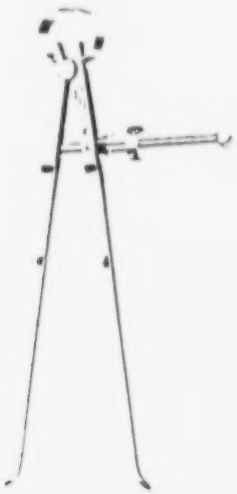

Figure 11
Inside Calipers

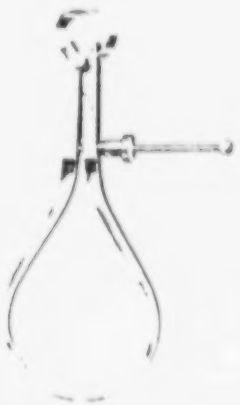

Figure 12
Outside Calipers

Figure 13
Dividers

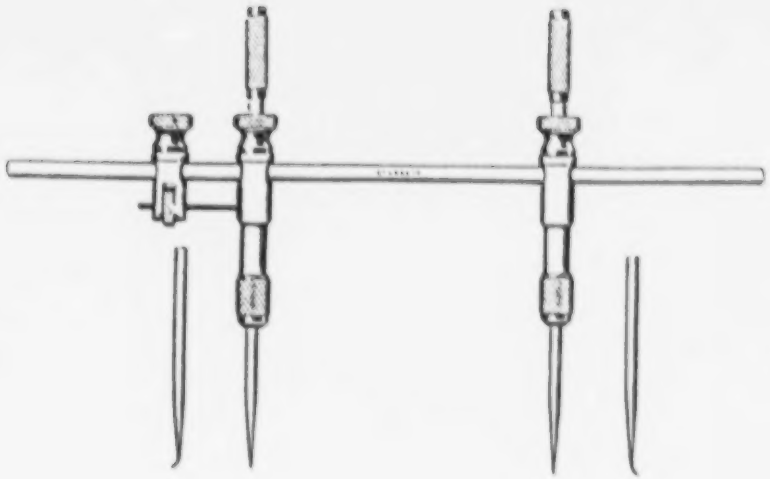

Figure 14 Steel beam trammels

Figure 15
Dial indicator

Figure 16 Gage block set

DEGREE OF PRECISION OF NUMBERS

The degree of precision of a number or measurement depends upon the number of decimal places used. The number becomes more precise as the number of decimal places increases. For a measuring instrument, the precision is determined by the smallest unit or calibration on the instrument.

Example 1. What is the degree of precision for 2 inches?

The degree of precision of 2 inches is to the nearer inch.

Example 2. What is the degree of precision for 2.0 inches?

The degree of precision of 2.0 inches is to the nearer 0.1 inch.

Example 3. What is the degree of precision for 2.00 inches?

The degree of precision of 2.00 inches is to the nearer 0.01 inch.

Example 4. What is the degree of precision for 2.000 inches?

The degree of precision of 2.000 inches is to the nearer 0.001 inch.

EXERCISE: Degree of Precision

For each measurement find the degree of precision.

1. 3.6"
2. 1.62"
3. 4.3"
4. 7.08"
5. 15.885"
6. 9.183 7"
7. 12.002"
8. 36.0"
9. 7.01"
10. 23.00"
11. 9.1"
12. 14.010 70"

Math 10
Module 18

GREATEST POSSIBLE ERROR

The greatest possible error of a measurement is one-half the smallest graduated unit of the measuring instrument used to make the measurement. Therefore, the greatest possible error is equal to $\frac{1}{2}$ or 0.5 of the degree of precision.

Example 1. A carpenter makes a measurement of $7\frac{3}{16}$ inches with a folding rule.

Find the greatest possible error and the smallest and largest possible actual length.

Since the smallest rule graduation is $\frac{1}{16}$ inch, the precision is $\frac{1}{16}$ inch.

The greatest possible error is $\frac{1}{2}$ of the degree of precision.

$$\frac{1}{2} \times \frac{1}{16}" = \frac{1}{32} \quad \text{Ans.}$$

The smallest possible actual length is equal to the measured length minus the greatest possible error.

$$7\frac{3}{16}" - \frac{1}{32}" = 7\frac{5}{32}" \quad \text{Ans.}$$

The largest possible actual length is equal to the measured length plus the greatest possible error.

$$7\frac{3}{16}" + \frac{1}{32}" = 7\frac{7}{32}" \quad \text{Ans.}$$

Example 2. A metal fabricator reads a measurement of 24 millimetres on a steel rule. Find the greatest possible error and the smallest and largest possible actual length.

The greatest possible error is 0.5 of the degree of precision.

0.5 x 1 mm = 0.5 mm Ans.

The smallest possible actual length is equal to the measured length minus the greatest possible error.

24 mm - 0.5 mm = 23.5 Ans.

The largest possible actual length is equal to the measured length plus the greatest possible error.

24 mm + 0.5 mm = 24.5 mm Ans.

Example 3. A tool and die maker makes a measurement of 0.375 8 inch with a vernier micrometer. Find the greatest possible error and the smallest and largest possible actual length.

The greatest possible error is 0.5 of the degree of precision.

0.5 x 0.000 1" = 0.000 05" Ans.

The smallest possible actual length is equal to the measured length minus the greatest possible error.

0.375 8" - 0.000 05" = 0.37575" Ans.

The largest possible actual length is equal to the measured length plus the greatest possible error.

0.375 8" + 0.000 05" = 0.375 85" Ans.

Exercises: Greatest Possible Error:

For each of the exercises in the tables the measurement made and the smallest graduation of the measuring instrument used is given. Determine the greatest possible error and the smallest and largest possible actual length for each exercise.

English System Exercises

	MEASUREMENT MADE (inches)	SMALLEST GRADUATION OF MEASURING INSTRUMENT USED (inches)	GREATEST POSSIBLE ERROR (inches)	ACTUAL LENGTH	
				SMALLEST POSSIBLE (inches)	LARGEST POSSIBLE (inches)
1.	$23\frac{7}{16}$	(folding rule) $\frac{1}{16}$			
2.	$5\frac{7}{8}$	(tape measure) $\frac{1}{8}$			
3.	15 68	(steel rule) 0 02			
4.	8 30	(steel rule) 0 05			
5.	0 753	(vernier caliper) 0 001			
6.	0 936 9	(vernier micrometer) 0 000 1			

LOS MEDANOS COLLEGE
Math 10
NURSING AND PHARMACOLOGY

CONVERSIONS AND MEDICAL ABBREVIATIONS

MODULE 15N

Doctors may often prescribe medication using Apothecaries' units of measure, while you have the drug in a metric quantity. As a result, accurate conversions from one system to the other are necessary. In addition, while medications are generally prescribed in the Metric or Apothecaries' systems, the lack of available measuring devices for these systems makes it important to be able to convert Metric and Apothecaries' units to household units and vice-versa. This module first gives further practice in inter-system conversions using ratio and proportion and dimensional analysis.

In addition to conversions, a working knowledge of medical abbreviations is just as critical in a nurse's ability to accurately administer medication. The second portion of this module introduces you to many of the abbreviations you will encounter and need to master.

OBJECTIVES

When you successfully complete this module, you should be able to:

1. Convert from one system of measurement to another.
2. Understand and use the Latin abbreviations commonly used in nursing practice.
3. Understand and use the medical abbreviations commonly used in nursing practice.

PROCEDURE

1. Read sections 8.1 through 8.4, pages 196 through 209. After each section work:
   a. all of the problems in the Readiness Review.
   b. all of the odd-numbered review problems.

2. a. Work all problems in the Chapter 8 Readiness Review, pages 211 and 212.
   b. Work all of the odd-numbered problems in the Chapter 8 Review Problems, pages 213 through 215.

3. Try the practice test and, if successful, go on to the module exam. Again, bear in mind that you are responsible for all conversions in Chapter 7 as well as those given in Table 8-1. No conversion tables will be given to you on the exam.

LOS MEDANOS COLLEGE
Practice test 15N

1. Convert 2½ f℥ to tbsp _____

2. Convert 1680 ml to pt. _____

3. Convert 0.73 kg to ℥ _____
(Apothecaries', not English ounces.)

4. Convert 16.82 cm to feet _____

5. Convert 3.2 kg to pounds (English) _____

6. Convert 170 Minims to ml _____

7. Convert 2½ grains to milligrams _____

8. Fill in the following blanks:

	ABBREVIATION	MEANING
a.	q.i.d.	_____
b.	_____	nothing by mouth
c.	p.r.n.	_____
d.	_____	electrocardiogram
e.	URI	_____
f.	_____	as directed
g.	cibus	_____
h.	_____	complete blood count
i.	BE	_____
j.	_____	after meals

9. Rewrite the following, using the meaning of the abbreviations:

a. Laboratory tests: UA, UGI, BUN

_____

_____

b. PEN VK 250 mg #100: Take 1 tab t.i.d. a.c. until gone

_____

_____

c. Dx: possible ASHD
Laboratory tests: ECG, CBC

_____

_____

4/3/86 DC

(alt. answer 24.3 fl. z.)

1. 5 tbsp 2. $3\frac{1}{2}$ pt. 3. 22.8 oz 4. 0.55 ft. 5. 7.0 lb

6. 10.6 ml or 11.3 ml 7. 162.5 mg

8. a. four times a day
   b. NPO
   c. as needed
   d. EKG or ECG
   e. Upper respiratory infection
   f. ut dict or u.d.
   g. food
   h. CBC
   i. barium enema
   j. p.c.

9. a. Laboratory tests: Urinalysis, upper gastrointestinal series, blood urea nitrogen.

   b. PEN VK 250 milligrams #100: Take 1 tablet three times a day before meals until gone.

   c. Diagnosis: Arteriosclerotic heart disease

      Laboratory tests: electrocardiogram, complete blood count.

LOS MEDANOS COLLEGE
Math 10
Consumer Applications

YOUR PAYCHECK - WAGES

MODULE 16C

Before we invest more effort in learning to manage our money, we should make certain we have some money to manage. For most people money is obtained from an employer as compensation for work performed. Employees are usually paid in one of the following ways: Hourly (plus overtime in some cases), commissions, or on an anual basis. Employers will always keep track of an employees hours, overtime, commissions, etc. but errors do occur in payroll departments, so it is always a good idea to know what to expect in your next paycheck. This will help avoid misunderstandings between you and your employer. In the next module (17C) we will deal with payroll deductions for social security and income taxes, but for now we will just determine the total amount earned which we call gross wages.

OBJECTIVES

You should be able to:

1. Compute earnings at an hourly rate including overtime rates.
2. Compute average earnings.
3. Compute annual salary.
4. Compute commission.

PROCEDURE

1. Work the drill problems on page 57.
2. Read pages 57 and 58.
3. Work the problems on pages 58 - 60.
4. Work the drill problems 6 - 15 on page 60.
5. Read pages 60 and 61.

   Some overtime is paid at double-time rather than time-and-one-half for all hours over 40 worked in one week.

The example on page 61 for double time would be:

44 hours worked
- 40 hours
4 hours overtime

1 x 4 = + 4 hours bonus for overtime
8 hours pay for overtime

$ 5.20 per hour
x 40 hours
$208.00 regular pay

$ 5.20 per hour
x 8 hours overtime
$ 41.60 overtime pay

$208.00 regular pay
+ 41.60 overtime pay
$249.60 Total pay

6. Work the problems on pay 61.

   When you work the problems in #5 work them for time-and-a-half overtime pay and double-time overtime pay. (The time-and-a-half answers are in the back of the book.) The double time answers are: Fraser, $271.96; Gregory, $350.00; Harris, $269.76; Iver, $252.00; Jordan, $235.40; Kelley, $322.00; Lamonte, $357.28; Mullins, 270.00.

7. Read page 62.

   Note that the rules for rounding off are the same as we've done previously.

8. Work the problems on page 62 and 63.

9. Work the drill problems on page 63.

10. Read pages 63 and 64.

    There are two concepts in this section: Commission, and average weekly earnings. We will work more with averages in later modules.

11. Work the problems on pages 64 and 65. Pay special attention to problems 7, 8, 9, as they introduce variable commission.

12. Review the objectives for this module.

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13. For a practice test work the review problems 1, 3, 5, 7 on pages 79-80.
Note that some information is missing from problem #1. The employee whose time card is on the left earns $4.00 per hour. The employee whose time card is on the right earns $5.00 per hour.
Work problem #3 for double-time overtime pay as well as for time-and-a-half.
(Answer: #3, $182.40)

Also work the following problem:
Fred receives a salary of $550 a week plus a 9% commission on all sales up to $450 and a 14% commission on all sales over $450. Last week he sold $720 worth of merchandise. How much did he earn last week?

(Answer: $628.30)

14. Ask for Module 16C test.

Auto Literacy Program

Yuba College

Background:

Yuba College developed the Auto Literacy Program in 1989 under a special Fund for Instructional Improvement (FII) grant from the Chancellor's Office. The local community has 12 percent unemployment and the lowest per capita income in the state. Targeted toward limited English proficient, drop-out, GAIN and JTPA, and unemployed high-risk students, the vocational education department saw the need for a basic skills course after nearly 50 percent of their automotive students failed or dropped out because of poor academic backgrounds.

The college absorbed the cost of the program in 1990 and is attempting to gain district support to ensure funding in 1991.

Purpose:

The program was launched by the vocational education department when frustrated instructors and administrators determined that the reading level of automotive students in basic courses was far below that of the texts used. While the courses were designed for 12th to 16th grade level on the Frye readability scale, many of the students tested in the elementary school range. The college identified three types of students: Those who were weak in academic skills, those who were weak in vocational skills, and those weak in both areas. Because of this variety, the program design needed to accommodate general learning issues. With this goal in mind, the following informal objectives were set:

- Make students successful while giving them employable skills;
- Institute academic skills into the automotive classes thereby creating a bridge between the academic and vocational divisions; and
- Develop a better background for students with reading and vocational deficiencies.

To meet these objectives, an outside literacy consultant was contracted to review course materials, determine course competencies, and design the course curricula.

Description of Program:

Automotive students demonstrating low reading levels via matriculation assessments are identified by college counselors. Those interested in pursuing automotive technology are recommended to enroll in Auto Technology 221R (A.T. 221R), Basic Auto Skills. A.T. 221R is a course which combines basic reading instruction with Auto Technology 21 (AT21), an introductory automotive course that focuses on background, tool identification, measurements, and parts relationships. The program was designed as a three unit, five-hour per week non-traditional adjunct course: each week students receive three hours of technical information and two hours of reading instruction. In addition, a reading lab is available for individualized tutoring and reading assistance.

The program is unique inasmuch as the instructors coordinate the curriculum by using a functional-literacy approach and team teaching techniques. The instructional assistant, with a background in reading, uses the texts and assignments from A.T. 221R, the introductory core class, as the base for his instruction. He teaches learning skills to the students, emphasizing automotive vocabulary, chapter mapping (outlining), flow-charting, and note-taking during the lessons. The instructional assistant feels that until the proper learning techniques are taught to the students, their reading and comprehension will not improve. The automotive instructor uses visual/manipulative learning techniques to supplement the textual concepts, guiding students through the course with diagrams, photographs, charts and hands-on instruction, such as physically disassembling an engine to show parts relationships.

Development:

Using FII grant monies to start the program, the Associate Dean of Applied Arts, Science and Technology, instructors, and other key college personnel assessed the problem and brainstormed solutions. It was determined that a functional-literacy basic skills course offered as an adjunct course for the automotive division would be most effective in meeting student needs.

The college's search for suitable models or appropriate texts proved unsuccessful, as few models existed. The staff decided to try a visual learning, interrelated curriculum whereby the team teaching approach could be used. [Note: Mark Davenport, Instructional Assistant at Yuba College,

has written his master's project on automotive literacy and teaching techniques used at Yuba College. His project is entitled Helping Automotive Technology Students Learn From Text: A Teacher's Handbook and is expected to be published in the summer of 1991.]

In the second year of the program the FII grant was denied. To overcome this setback the Associate Dean of Applied Arts, Science and Technology obtained approval to fund the program through college monies. Other barriers encountered by the college were minimal. To obtain vocational instructor acceptance, the college involved the vocational instructors in the initial planning and design.

Recommendations for Replication:

For a specialized program such as Auto Literacy, Yuba College has several essential elements for replication:

- Communication between academic and vocational departments is key;
- Involvement of the Dean of Vocational Education is important to ensure funding;
- Find the right instructor -- one that is committed and understands the importance of basic skills;
- Include instructors and counselors in problem solving sessions from the outset of the program;
- Identify a "safety-net" -- an instructor or counselor who can work to keep students attending;
- Use a "hands-on" approach to instruction to keep high-risk students interested in the course material; and
- Be willing to modify.

Evidence of Effectiveness or Impact:

The program is not yet in its third year, so evidence of effectiveness is premature. The college has proposed to use their established tracking procedures to measure course retention rates and employment rates for

evaluation of the automotive program's impact. Because students can obtain a variety of certificates in the automotive field, it is rare that a student will complete an A.A. or A.S. degree. An informal evaluation of the teaching techniques was performed by an outside consultant and recommendations were made as to the most effective techniques. The college feels that not only do the students benefit from the program but that the local economy will benefit with the reintroduction of "skilled" workers.

Contact:

Don Ferraiuolo
(916) 741-6766

Sample Materials: Yuba College

NAME _____

YUBA COLLEGE
BASIC AUTOMOTIVE SKILLS

---

1. COURSE ORIENTATION — SCORE

Objective
To provide an understanding of:
- -the method in which the class will be conducted
- -the course content
- -an overview of what is expected of the student
- -the shop rules that are to be observed at all times

Student Performance
Jobs: To provide a 5 section, divided notebook (by second Monday of the semester - assignments, notes, outlines, handouts) 30___
To provide a white coverall or shop coat 30___

---

2. SAFETY

Objective
To provide the student with an awareness of the need for safety.
To provide the student with the knowledge of safe working habits and precautions needed to safely work in the shop.

Student Performance
Jobs: None
Tests: Safety exam (1 point per correct answer - total 67 possible)
All questions corrected 33___

---

3. Automotive Manual Usage

Objective
To be able to locate specific information necessary to complete a repair operation.
To understand the variety of automotive manuals which are available.

Student Performance

Jobs:	Complete Car Spec. Sheet #1,	Mitchell	20___
		Motor	20___
	Complete Car Spec. Sheet #2,	Mitchell	20___
		Motor	20___
	Complete Car Spec. Sheet #3,	Mitchell	20___
		Motor	20___
	Complete Car Spec. Sheet #4,	Mitchell	20___
		Motor	20___
	Complete Car Spec. Sheet #5,	Factory	20___

---

4. Automotive Technology

Objective

To be able to communicate in a technical manner with others in the automotive industry.

To be able to understand the information which is available.

Student Performance

Jobs:	Complete Vocabulary List Set #1	25___
	Complete Vocabulary List Set #2	25___
	Complete Vocabulary List Set #3	25___
	Complete Vocabulary List Set #4	25___

---

5. Measuring Systems

Objective

To have a working knowledge of the different measuring systems used in the automotive field.

To be able to make any necessary measurements when making a repair or adjustment.

Student Performance

Jobs:		
Identify the graduations on a ruler, inch		20___
Identify the graduations on a ruler, metric		20___
Convert a dimension,	___ inch = ___ cm	10___
	___ cm = ___ inch	10___
Measure tire pressure,	___ psi	10___
	___ kpa	10___
Convert a pressure,	___ inch = ___ kpa	10___
	___ kpa = ___ inch	10___
Convert a weight,	___ pounds = ___ grams	10___
	___ grams = ___ pounds	10___
Convert a volume,	___ cubic inch = ___ cc	10___
	___ cc = ___ cubic inch	10___
	___ cc = ___ liter	10___

Convert a torque reading,

___ foot-pound = ___ newton-meter	10___
___ newton-meter = ___ foot-pound	10___
___ foot-pound = ___ inch-pound	10___

---

6. Tools

Objectives

To be familiar with the variety of hand tools which are useful in automotive repair.
To be able to select the best tool for a particular job.
To be able to use tools in a safe and efficient manner.

Student Performance

Jobs:

Complete Tool Identification Group 1, -screwdrivers	25___
Complete Tool Identification Group 2, -pliers	25___
Complete Tool Identification Group 3, -wrenches	25___
Complete Tool Identification Group 4, -sockets	25___
Complete Tool Identification Group 5, -hammers, punches & chisels	25___

---

7. Precision Measurement

Objectives

To be able to make an accurate measurement needed to complete a repair or adjustment.
To be able to select the convert instrument to make a measurement.

Student Performance

Jobs:

Measure an outside dimension using an outside michrometer_____.	25___
Measure an inside dimension using an inside michrometer_____.	25___
Measure a depth dimension using a depth michrometer_____.	25___
Measure an outside dimension using an vernier caliper_____.	25___
Measure an inside dimension using an vernier caliper_____.	25___
Measure a depth dimension using an vernier caliper_____.	25___
Measure an end play dimension using a dial indicator_____.	25___

Measure an end play dimension using a feeler gauge_____. 25___
Measure a clearance dimension using a feeler gauge_____. 25___
Measure battery voltage, analog meter, ___volts. 25___
Measure battery voltage, digital meter, ___volts. 25___
Measure battery voltage, light on, analog meter, ___volts. 25___
Measure battery voltage, light on, digital meter, ___volts. 25___
Measure resistance, analog meter, ___ ohms. 25___
Measure resistance, digital meter, ___ ohms. 25___
Measure vaccum, ___inches mercury. 25___

---

8. Fasteners

Objectives

To be familiar with the variety of fasteners which are available.
To be able to select the correct replacement.
To be able to determine how tight a particular fasteners should be tightened.
To be able to repair a damaged thread.

Student Performance

Jobs:

Complete bolt identification set. 25___
Locate a torque specification, ___ bolt 20___
Tighten a bolt to the correct torque ____ ft-lb. 25___
Make an internal thread, ___ size thread, ___ size tap drill. 25___
Make an external thread. 25___
Repair a thread using a thread chaser. 25___
Repair a thread using a thread file. 25___
Install a pop-rivet. 25___

YUBA COMMUNITY COLLEGE **COURSE OUTLINE** Static Id# 120220 00

Date Effective Spring 1990

(1) Department Auto Tech No. 221R Title Basic Automotive Skills

Division A.A. & S. Total Crs. Hrs. 96 Lec Hrs 36 Lab Hrs 54 Units 3.0

Abbreviated Title (max. of 16 including spaces) For Schedule B A S I C A U T O S K I L L

(2) NEW COURSE [X] REVISED COURSE [ ] TECHNICAL REVISION [ ]

(3) DEGREE CREDIT [ ] NON-DEGREE CREDIT [X] NONCREDIT [ ]

(4) Changes in Revised Courses

Minor		Major	
No Change (Update)	[ ]	Change in Units	[ ]
Change in Dept.	[ ]	Lecture hrs.	[ ]
Change in Course #	[ ]	Lab hrs.	[ ]
Catalog Description	[ ]	Other Changes	
Other Minor Change			

(5) Grading Method
Letter [ ] CR/NC [X]

For Office Use
DP Input 2C 112990
TOPS Code 0949.10
SAM CODE D
Crs. Classification 4
Transfer Code 0
Note

(6) CATALOG DESCRIPTION: (Maximum of 370 characters including spaces)

An introduction to automotive repair to develop the basic skills needed to service the modern automobile. Learning to use hand tools, measuring tools and equipment, fasteners, and service manuals. Emphasis on development of automotive vocabulary, reading, reasoning, and manipulative skills required for employment in the industry.

(7) PREREQUISITE(S) None

(8) SKILL REQUISITE Language Mathematics Exception

(9) TOPICAL OUTLINE OF SUBJECT MATTER

I. Information Sources-Manuals:
   Varieties
   Information Layout
II. Automotive Terminology
III. Measuring Systems:
   Inch-Metric
   Fractions-Decimals
   Pound-Gram
   Conversions
IV. Tools: Hand, Power
V. Precision Measurement:
   Micrometer varieties
   Dial indicators
   Vernier calipers
   Feeler gauges
   Torque wrenches
   Electrical measurement
     Volts: analog & digital
   Pressure-Vacuum Measurement
VI. Fasteners:
   Threaded - sizing systems and
     thread forming & repair
   Non-threaded rivets

(10) SPECIFIC STUDENT PERFORMANCE OBJECTIVES
At the conclusion of this course, the studer will be able to:

Locate specific service operations and specifications in a service manual.

Read and understand the procedure to make a repair.

Use the proper tool(s) to make a repair.

Select the correct size and type of bolt when choosing a replacement.

Make a measurement using a micrometer, vernier caliper, or dial indicator or feeler gauge.

Use a torque-wrench to correctly tighten a bolt

Convert a measurement from a fractional or decimal inch size to the equivalent metric size

Identify common terms used in the automotive industry.

Read a chapter of automotive text and construct an outline of that material.

(11a)TEXT - Author(s)
Title:
Publisher: Edition: Date:

Or Equivalent

(b)Other Required Materials

Notebook/three ring binder

(12)Describe the class organization and method (discussion, lecture, laboratory, oral reports, student attendance standards):

Discussion and lecture with laboratory demonstrations and exercises. The laboratory exercises will be conducted with help from an instructional assistant, tutors and interpretors.

Attendance: 2 in a row or 3rd absence drop

(13)Describe the outside preparation required of students: reading assignments, writing assignments, problems, practice in skills, term papers, other):

Reading assignments of vocabulary and nomenclature lists. Writing assignments to consist of outline development exercises.

(14)Identify any other field or major with which this course correlates:

NONE

(15)Grading (If activity class and eligible for an exception (E), please indicate what percentage of grade is based on skills demonstration.)

a) On what will the student's grade be based:

Completion of laboratory activities.

b) Describe minimum standards:

Successful completion of 70% of the assigned work.

c) Describe how student writing is to be considered, or how problem solving or skills demonstration will be evaluated:

By observation from instructor and I.A.

(16)For what student population is this course intended. Discuss needs, reasons for offering the course, how it relates to division plans.

This class is being developed to assist students with limited reading and literacy skills and to provide them with the basics needed to be successful in the automotive program.

(17)For revised courses indicate below substantial changes in division resource requirements, if any, i.e., delivery method, facilities, equipment, staffing. Explain. (if none, so state)

N/A

(18)What new or additional facilities, equipment, or other expensive items will be requir to teach the course? How do you propose they be provided?

Computer with software, VHS tape player, and additional shop tools. Budget will be provided throught JTPA, VEA and improvement funds.

(19)What new or additional library media and other district resources will be needed to offer the course?

Additional VHS video tapes describing automotive systems.

(20)Describe the significant problems that may be encountered in starting the course, and suggest how these may be solved:

Development of class activities suited for this type of student. This will be developed i conjunction with ESL and Learning Skills specialists.

(21)Estimate enrollment in this course: 20/SEM Describe special size requirement, special curricular requirement, growth potential:

(22)Number of proposed Sessions: in Day Fall 1 in Day Spring 1

Night Fall _____ Night Spring _____ Summer _____

(23)Staffing:
a) Can this course be taught with the present full time staff: yes [X] no [ ]
b) If "NO", explain how staffing will be provided:

(24)Articulation: This course is intended to be (respond to all that apply):
a) general education at: CSUC [ ] UC [ ] Yuba [ ] (petition filed?)
b) transferable to: CSUC [ ] UC [ ] Other [ ]
c) required in transfer major _____ If yes, in what major? _____

to what school? _____ and, what is the title of that school's equivalent course? _____

After course approval, check with the Articulation Officer for current status of this course.

(25)Approvals: The following signatures are required:

Prepared by _____, title, Instructor Date 9 JAN 90

Center/Division Dean Don Jensen Date 1/10/90

Articulation Officer's Recommendation non degree/non transfer Date 1/11/90

Signature _____ Date 1/11/90

Dean of Instruction _____ Date 1/15/90

Curriculum Committee Chairs Robert E Patton/Annette Cameron 1-25-90

Date of Governing Board Approval 3/14/1990

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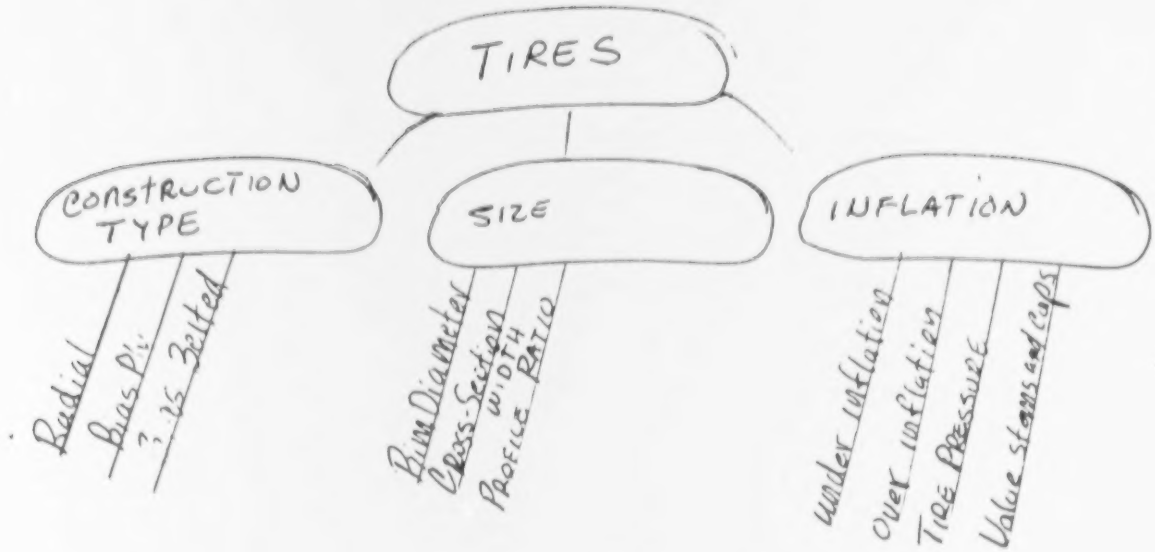
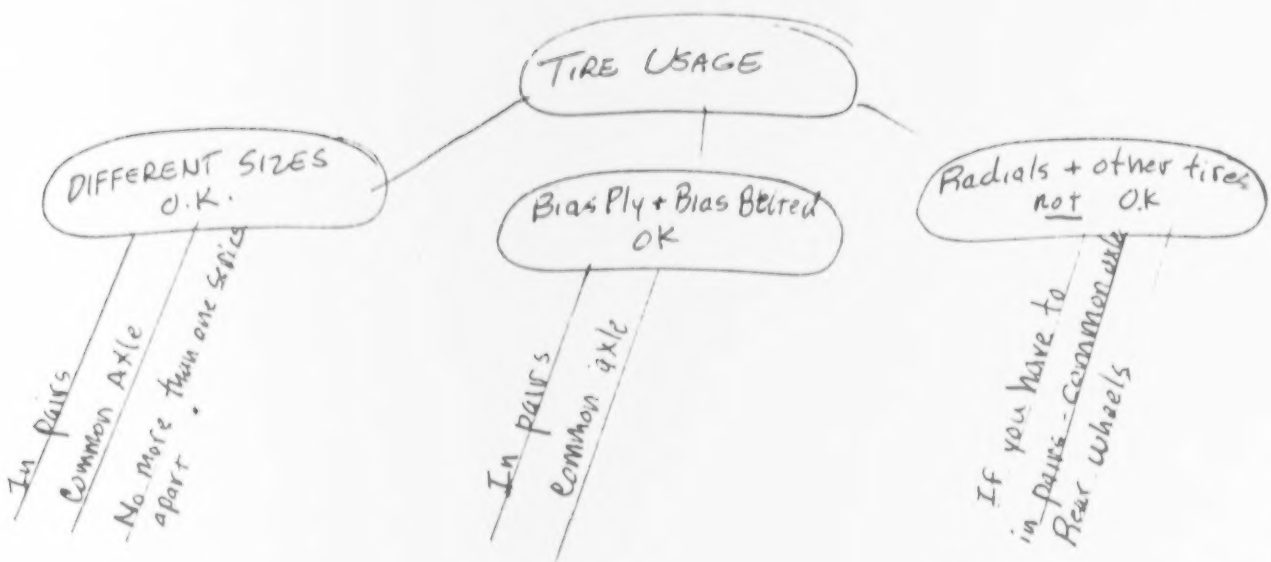
California Education Code (Title V) Checklist

The course outline must indicate how these requirements are met in the outline entries cited by the number in parentheses. Check off the requirements as the outline is drafted. The Title V requirements have been paraphrased for brevity here. If course complies with new regulations, check (✓) Yes (Y) box. If an exception from new regulations, check exception (E) box.

AA DEGREE CREDIT	NON-DEGREE CREDIT	NON-CREDIT
55805.5 Content & objectives of course fall into one of categories a-e of this section of Title V. (1) (6) (3) Y ☐		84711a(1-9) Education Code Content & objectives on non-credit courses must fall in one of these 9 categories. Y ☐
55002a(2) Credentialed Instructor (25) Y ☐	55002b(2) Credentialed Instructor (25) Y ☐	55002c(2) Credentialed Instructor (25) Y ☐
55002a(3) Offical outline with: a) scope, units, objectives, and content (1) (9) (10) Y ☐ b) reading & writing assignments & homework (13) (12) E ☐ Y ☐ c) teaching methods (12) Y ☐ d) methods of evaluation (15) ☐	55002b(3) Official outline with: a) scope, units, objectives, and content (1) (9) (10) Y ☒ b) reading & writing assignments & homework (13) (12) E ☐ Y ☒ c) teaching methods (12) Y ☒ d) methods of evaluation (15) ☒	55002c(3) Resource materials, attendance, achievement standards, approved by curriculum committee (12) (15) (19) Y ☐ 55002c(4) Official outline with: a) scope, objectives, and content (9) (10) Y ☐ b) teaching methods (12) ☐ c) methods of evaluation (15) ☐
55002a(4) Instructional objectives are common to all students. (9) (10) Y ☐	55002b(4) Instructional objectives are common to all students (9) (10) Y ☒	
55002a(5) Student performance is evaluated in part by written assignments or problem solving or skill demonstration if more appropriate; A formal grade is assigned. (15) Y ☐	55002b(5) Student performance is evaluated and assigned a formal grade (15) Y ☒	
55002a(6) Carnegie Units: 3 hrs. work per week per unit, prorated for labs, etc. (9) (10) (12) (13) Y ☐	55002b(6) Work required per unit locally determined (9) (10) (12) (13) Y ☒	
55002a(7) Scope & intensity of work require independent study outside class (12) (13) (10) (or in lab) Y ☐		
55002a(8) Entrance skills, prerequisites (7) (8) E ☐ Y ☐	55002b(7) Prerequisites as applicable (7) (8) Y ☒	
55002a(9) College level language & computational skills necessary (8) E ☐ Y ☐		
55002a(10-11) Requires critical thinking, ability to apply "college level" concepts, vocabulary, and learning skills, as determined by local curriculum committee. (9) (10) (12) (13) (15) Y ☐		
55002a(12) Uses educational materials approved by the curriculum committee as "college level" (11) (19) Y ☐ E ☐		

Mapping – Ch. 4 Remling




TIRE USAGE
DIFFERENT SIZES O.K.
Bias Ply + Bias Belted OK
Radials + other tires not O.K
In pairs
Common Axle
No more than one size apart
In pairs
Common Axle
If you have to in pairs - Common with Rear wheels

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SAMPLE LESSON PLAN

Lesson: Introduction to front end suspension systems.

Learning Goal/Objective: By the end of this lesson, students will comprehend the core concept of front-end suspensions and the use of selected reading strategies.

Target reading strategies:

1. Prereading	-Activating one's prior knowledge before reading.
2. During-reading	-Generating reading guide questions.
3. Postreading	-Generating a semantic map as a chapter summary.

Prereading Activities

Concept Map A concept map can introduce a core concept of a chapter and explain all of its attributes.

Procedure

1. To have a class work together to form a concept map, write the term, "lever arms," on the board and ask: "What are examples of lever arms?" Write their responses to one side of the board.
2. Demonstrate how a lever arm functions using tools such as long-handled bolt cutters and short-handled pliers.
3. Allow students to determine how different-length lever arms work.
4. Help the students to summarize verbally examples and properties of lever arms and prepare a concept summary. Figure 10 is an

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example of a concept summary map for lever arms.

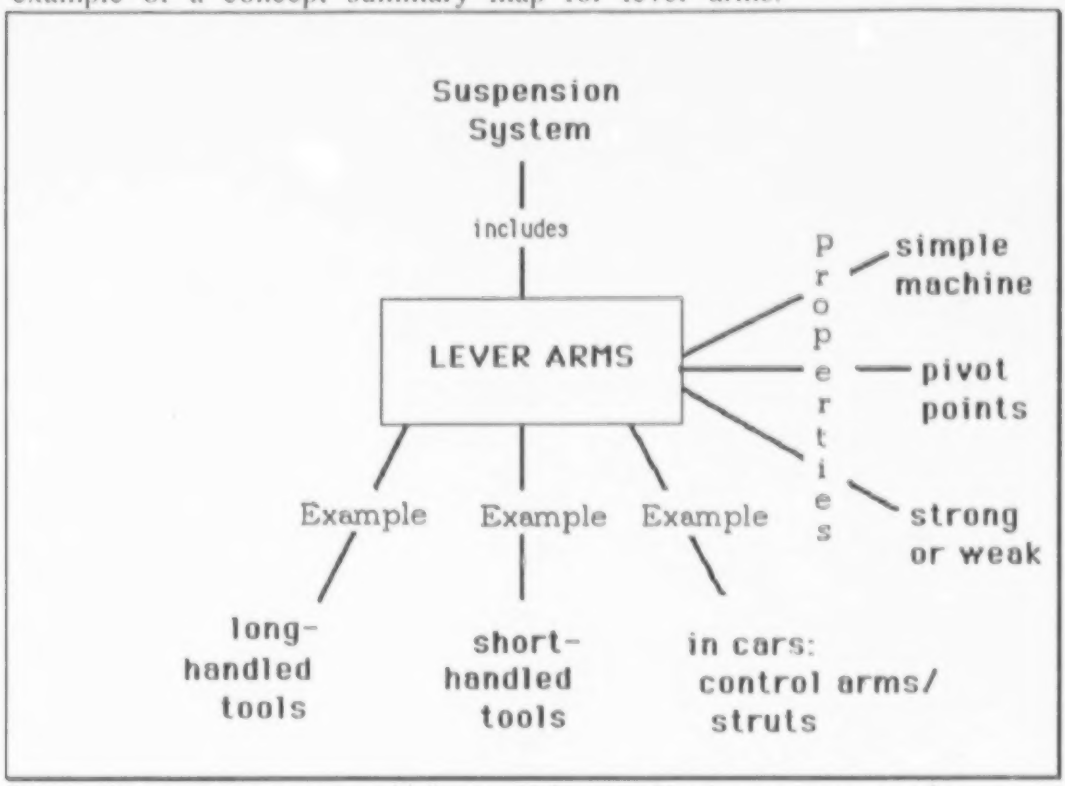

Figure 10. A concept map which summarizes students' statements on the examples and properties of levers.

5. To tie the core concept to the lesson, ask questions that do not use any new technical vocabulary to stimulate discussion:

1. What do you think could cause the front tires of a car to vibrate while driving and the whole vehicle to bounce severely after hitting a bump?
2. What do you think could cause one or both front tires on a car or truck to wear out while still new?
3. Why is the ride in a big car such as a Chevrolet Monte Carlo smoother than the ride in a smaller car? Is there any lever action involved in this?
4. What could cause a car's front end to dip and then rock back and forth after stopping quickly? Is this rocking a lever

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Flowcharting - Procedures

Suspension and Steering Systems - Birch p. 8

Repair TIRE Leak pg. 85 - Birch

- LOCATE Leak ← run water & look for bubbles / TEST TANK
- Mark Leak
- If in tread, plug and patch
- Spray prebuffing cleaner
- Scrape or wipe
- Clean hole with probe or rasp
- Coat hole & plug with cement
- Plug Hole
- Trim Plug
- Buff inner plug
- COAT With cement
- Remove patch back
- Place PATCH ON HOLE
- Stitch patch in place - center to sides
- GET BUBBLES OUT.
- PRESS PATCH DOWN FIRMLY

Split Page Notes

QUESTIONS / CUES	CLASS NOTES — FOLD OVER FOR REVIEW
Bias Ply Tires	Bias ply tires usually have 2 or 4 plies they usually crisscross at centerline at a 35° angle. Alternate plies cross at opposite angles and extend from bead to bead.
Bias Belted Tires	Bias belted tires are bias ply tires that have 2 or more belts under the tread. The tread is more rigid. Reduces tread motion. Prolongs tread life.
Radial Ply Tires	Radial Ply Tires - have cords that run bead to bead, crossing the centerline at 90°. Cords radiate from the center of the tire. Increase rigidity - increases flexibility of sidewalls.

FOLD LINE

2½"	6"

AUTOMOTIVE TOOLS, FASTENERS, AND MEASUREMENTS

A TEXT-WORKBOOK

William H. Crouse
Donald L. Anglin

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College Skills for Health Occupations Students, Vocational Education Special Topics, and Functional Literacy

Santa Rosa Junior College

College Skills for Health Occupations Students

Background:

In the summer of 1990, Santa Rosa Junior College first offered College Skills 303: College Preparatory Skills for Health Occupations. Instructors from the Learning Center found that the health occupations division was referring a large proportion of health science students for basic skills remediation. Many students were not passing the required pre-health occupations entrance examination due to basic skills deficiencies. The college applied for a Fund for Instructional Improvement (FII) grant from the Chancellor's Office to conduct a formal needs assessment to determine specifically those skills students lacked to be successful in health careers.

As a result of the needs assessment process, Learning Center staff, working with faculty from the health occupations division, developed this course. The course was approved through the college's standard program approval process, in compliance with Title V regulations. On-going funds for the course are provided through the college's general fund.

Program Description:

This course is designed specifically to facilitate the transition of students into the health occupations program at the college by providing them with the basic skills needed to enter and be successful in health careers. Instruction is provided by Learning Center staff in basic mathematics, scientific and technical reading and writing, career options, study skills, and critical thinking skills--all within the context of health occupations. Students read materials and participate in other instructional activities based on particular examples from the health sciences.

The course includes a variety of special instructional materials emphasizing the health occupations. These materials include textbooks focused on mathematics skills for nurses, videos, and health-related articles from professional and general magazines for reading comprehension. Students also undertake a research project, where they select an organ or body system and prepare a detailed written report, along with an oral presentation to the class.

Students become aware of this course through counselors, direct mailing to those students failing the pre-health occupations entrance examination, and flyers distributed at local convalescent care hospitals designed to target nursing care assistants. Students earn three units of basic skills credit for the course. These units are non-transferable and not applicable for credit to the A.A./A.S. degree.

Recommendations for Replication:

According to staff at the college, a similar course could easily be established at other colleges in a variety of vocational areas. However, based on their experience, staff recommend that other colleges:

- establish a good relationship with the faculty in the particular vocational area; and
- train a basic skills/learning center instructor in the specifics of the vocational program, as opposed to training the vocational instructor in basic skills curriculum and instructional methods.

Effectiveness of Impact:

No formal evaluation of the course has been undertaken to date. According to college staff, it is still to early to assess the impact of the program in terms of increased student enrollment and retention in vocational courses. However, informal feedback from students and health occupations instructors indicated that, as a result of the course, students have acquired specific mathematics and critical thinking skills necessary for future success in the health careers. In addition, instructors note that students appear better prepared to pass the pre-health occupations examination.

College Skills 303 was originally offered as a six-week summer session course. It was offered for the second time during the spring of 1991 as a 17-week course, so more detailed instruction could be provided to students.

Vocational Education Special Topics

Background:

Vocational instructors, particularly those in the industrial education area of the college, noted increased lack of understanding of basic arithmetic, communication, and study skills by students. To meet this need, in 1988, one faculty member, as a project for his M.A. thesis, developed a special topics vocational education course in collaboration with other vocational education faculty. The course received approval through the college's standard program approval process, in compliance with Title V.

Program Description:

This course is designed as a brief, eight week special topics course in vocational education. Depending on the faculty teaching the course, instruction is provided in basic skills, a general introduction to vocational education, or areas of instructor interest in specific particular vocational programs. Although the course was originally developed to target automotive students, the course has expanded to serve all students needing remediation. No special instructional materials have been developed for this course; as the course is faculty-developed and faculty-driven, instructional methods and curriculum vary depending on the instructor and course topic.

Students become aware of this course through the college schedule of classes. One unit of orientation credit is provided to students who successfully complete the course.

Recommendations for Replication:

According to staff at the college, a similar course could be developed at other colleges. However, staff note that the success of such a course is dependent on the specific student population of the college, and the needs of these students for basic skills remediation.

Effectiveness of Impact:

No formal evaluation of the course has been undertaken to date. However, according to college staff, there is informal evidence that this course is having a positive impact by increasing student enrollment and retention in

vocational courses. Moreover, students report that they have become better informed about how to be successful at the college as a result of this course.

Functional Literacy

Background:

For the past 10 years, Santa Rosa Junior College has offered a JTPA-linked course teaching functional literacy. The course evolved over the years from working with the local Private Industry Council (PIC) and JTPA agencies, which noted basic skills deficiencies of students. The PIC wanted to ensure that their trainees were succeeding in the work environment. Thus, vocational education faculty, working with basic skills instructors, the PIC and JTPA, business and industry representatives, and the college administration, developed this functional literacy course. The initial lack of understanding of the college system by the PIC and JTPA led to some initial difficulties in course development, but these obstacles were resolved over time.

No formal college program approval was required for this course, as it is a non-unit, off-campus course. On-going funds for the course are provided through the JTPA, with $80 provided for each hour of instruction.

Program Description:

Offered at two sites in the community, this course is designed to provide basic skills remediation for students so that they become successful and obtain gainful employment. The course is specifically targeted for JTPA students, particularly students in the clerical, construction, electronics, and landscape fields. No special instructional materials have been developed or purchased for this course.

Students become aware of this course concurrent with their occupational training. To date, more than 2,000 students have enrolled; no units are earned by students for this course.

Recommendations for Replication:

According to staff at the college, a similar course could be established at other colleges. However, for such a course to be successful, staff note that it is imperative that the PIC and JTPA have a solid understanding of the

college system to ease concerns related to course development and implementation.

Effectiveness of Impact:

The PIC conducted a formal evaluation of this course, examining enrollment data, job placement figures, and student reports of how the course met their needs. Findings from this evaluation indicated that the course has been effective in increasing student enrollment and retention in vocational courses. Moreover, students reported an increased sense of self-esteem and self-worth, with greater opportunities for access to formal education, as a result of this course.

Although the course has been run by Santa Rosa Junior College for more than 10 years, the California Human Development Corporation in Santa Rosa will assume leadership and direction for the course starting in the 1991 academic year.

Contact:

Susan Amalia
(707) 527-4364

Sample Materials:
Santa Rosa Junior College

Criteria and Procedures for New Course Acceptance

Department/number: College Skills 303 (formerly IntDis 303)
Course Title : College Preparatory Skills for Health Occupations 303

Abbreviation (19 space maximum) C/S/ /3/0/3/

I. Rationale Why is this course being proposed?

Students underprepared in basic skills should take this course in preparation for health occupations certificate programs, including the Vocational Nursing program, the Dental Assisting program, the Psychiatric Technician program, the Nursing Assistant/Home Health Aide program and the Medical Secretary/Receptionist program.

Students should take this course in order to fill gaps in their education in terms of the basic skills of math, scientific and technical reading and writing, effective studying, critical thinking and aquiring other knowledge from the health occupations fields. The course is designed to facilitate the transition into health occupations programs on campus.

II. Relationship to the present program at SRJC

A. What is the relationship of this course to the department and/or program within a department?

This class would be one of six "credit" classes offered by the department in preparation for college level coursework and structures learning activities for pre-health occupations students.

B. Is this course:

Required for the major? Yes_____ No___x____

an elective in the major? Yes_____ No___x____

of general interest to non-majors? Yes___x___ No_____

of specific interest to those employed in the field? Yes_____No____x___

being submitted to General Education Committee for CSU-GE? Yes _____
No____x____

being submitted to General Education Committee for SRJC-AA? Yes _____
No____x____

C. What is the impact of this course on other departments?

The Basic Skills and Vocational Studies Department is working in close cooperation with the director and coordinators of the health occupations programs on the SRJC campus to plan and schedule this class. Since this course is designed as a pre-Health Occupations course, the instructor teaching it will rely on the health occupations instructors and coordinators for feedback, referrals and curriculum elements.

D. Is the content of this course duplicated elsewhere outside of the proposing department?

Yes _____ No____x_____ (if yes, explain)

E. Is the number assigned appropriate (see explanation of course numbering attached)?

Yes ____x____ No _____

III. Relationship to similar course(s) at other colleges

A. Is this course offered within the CSUC system as a lower-division course?

Yes _____ No ___x____

B. Is this course offered within the UC system as a lower-division course?

Yes _____ No ___x____

C. Is this course offered at other community colleges?

Yes _____ No unknown

IV. Additional Comments

V. Recommendations

The following must be completed for all new courses presented to the Curriculum Review Committee.
Course outline prepared and proposed by: Julie Muzzatti

Date: May 21, 1990

Reviewed by Department Chair: Susie Amalie Date: 6/5/90

RECOMMENDATIONS BY DEPARTMENT CHAIR: Approve

Reviewed by Appropriate Dean: Date:

RECOMMENDATIONS OF DEAN:

SANTA ROSA JUNIOR COLLEGE
COURSE OUTLINE
(In conformance to Title 5)

COURSE & NUMBER: College Skills 303 (formerly IntDis 303)

ABBRV. TITLE (19 Characters): C/S/ /3/0/3/

FULL TITLE: BASIC COLLEGE PREPARATORY SKILLS FOR HEALTH OCCUPATIONS 303

TITLE 5: ASSOC. DEGREE APPLICABLE: YES ____ NO __x__NON-CREDIT: ____

CERTIFICATE APPLICABLE: YES ____ NO __x__

UNITS: MAX. __3__ MIN. __1__

CONTACT HOURS LEC: __3__ LAB: __2__ DHR: __1__

NON-CONTACT DHR ____ TOTAL # OF WEEKS: __17__

SELECTED TOPIC: YES: ____ NO: __x__

GRADING: LETTER GRADE ONLY: ____CR/NC ONLY: ____ OPTION: __X__

CONCURRENT COURSE: None

REPEAT CODE (Refer to catalog for correct code): 3

FULL DESCRIPTION AS APPEARS IN CATALOG:

Instruction in basic academic skills designed for pre-Health Occupations students planning to enter selected programs offered by Santa Rosa Junior College, including the Vocational Nursing, the Dental Assisting, Psychiatric Technician, Medical Secretary/Receptionist and Nursing Assistant/Home Health Aide programs. Prepares students for success in Health Occupation coursework through the study of math, Health Occupation-specific reading and writing, study skills, critical thinking and other concepts necessary to function effectively in the Health Care fields.

SCHEDULE DESCRIPTION (abbreviated form - approx. 500 characters max.):

Instruction in basic academic skills designed for pre-Health Occupations students planning to enter selected programs offered by Santa Rosa Junior College. Prepares students for success in Health Occupation coursework through the study of math, Health Occupation-specific reading and writing, study skills, critical thinking and other concepts necessary to function effectively in the Health Care fields.

PREREQUISITES: NONE

COREQUISITES: NONE

RECOMMENDED PREPARATION: NONE

OUTCOMES & OBJECTIVES:

By the end of the course, the student will be able to:

Math:

- compute the addition, subtraction, multiplication and division of whole numbers, fractions and decimals.
- demonstrate ability to interpret charts, graphs, tables and simple statistical information
- convert quantities from one unit to another
- demonstrate a rudimentary knowledge of dosage calculation
- demonstrate knowledge of the metric system

Reading:

- comprehend selected reading contexts by answering questions orally or in writing
- analyze a selected reading in terms of technical/scientific rhetorical function
- comprehend Health Occupation-specific vocabulary from selected texts
- apply pre-reading, skimming and scanning skills to Health Occupations-related written materials

Writing:

- respond to selected readings and/or discussion in written form
- write a descriptive report, with accurate spelling
- write a statement of purpose for entering a Health Occupations program with good paragraphing and syntax skills

Study Skills:

- preview a text for focus and content
- look up Health Occupations-related articles in the library
- demonstrate knowledge of test-taking strategies

Critical Thinking Skills:

- successfully solve problems in groups
- participate in discussions involving bio/medical ethics

CONTENT, TOPICS & SCOPE:

I. Math :

a.) a review of whole number division
b.) computations with fractions and decimals
c.) conversions of units
d.) an introduction to dosage calculation

II. Reading

a.) readings from selected texts in the Health Occupation fields
b.) rhetorical analysis based on clue words and sequence
c.) an exposure to the vocabulary used in the Health Occupations fields

III. Writing
a.) comprehension questions based on selected readings
b.) essay questions such as might be found in a Health Occupations class or a prerequisite class
c.) report writing

IV. Study Skills
a.) effective studying techniques
b.) test-taking strategies
c.) textbook previewing

V. Critical Thinking
a.) selected problem-solving activities
b.) classroom discussion on ethical issues
c.) guest lecturers/group discussion of what is expected of the Health Occupations student

ASSIGNMENTS:

Note: the following represent types of assignments in College Skills 303
- reading from textbooks
- answering comprehension questions in written or oral form
- computation exercises
- various writing activities including free-writing and reports
- library exercises
- short compositions

METHODS OF EVALUATION (Use the attached page and mark the items as directed)

REPRESENTATIVE TEXTS:

Curran and Munday: Math for Meds, Wallcur Inc.
Howett: Basic Skills With Math, Cambridge
Barnes: Reading and Critical Thinking, Contemporary

SUBMITTED BY: Julie Muzzatti, Instructor, Basic Skills and Vocational Studies

DATE: May 21, 1990

DEPT APPROVAL (Chair): [illegible] AREA DEPT: Basic Skills + Voc Studies

REVISION DATE: May 21, 1990

Course Outline Revised:

METHODS OF EVALUATION

For degree-applicable courses, you must mark at least one item in only one of the sections in category 1. For other courses, mark Section 1 if applicable

CATEGORY 1 - Substantial writing assignments including:

Section 1

___x___ Written homework ___x___ Reading reports _____ Lab reports

___x___ Essay exams _____ Term or other papers Other (specify) :

Section 2

This is a degree-applicable course, but substantial writing assignments are not appropriate because the course:

___ Is primarily computational
___ Primarily involves skill demonstrations or problem solving

---

Mark with an 'X' zero or more items in each category on this page.

CATEGORY 2 - Computational or non-computational problem-solving demonstrations, including:

__x__ Homework problems ____ Field work ____ Lab reports __x__ Quizzes
__x__ Exams Other (specify): _____

CATEGORY 3 - Skill demonstrations, including:

__x__ Class performance (s) ____ Field work ____ Performance exam
Other (specify): _____

CATEGORY 4 - Objective examinations, including:

__x__ Multiple choice __x__ True/false __x__ Matching items
__x__ Completion Other (specify): _____

Fill in Category 5 information only if applicable. Otherwise leave blank.

CATEGORY 5 - Other methods of evaluation including:

class participation

Basis for grades - indicate approximate percentage or range of percentages of course grade in each category based on the assignments previously noted:

Writing assignments . . . . . _20___ - __30__ %
Problem-solving demonstrations . . . . . _20___ - __30__ %
Skill demonstrations . . . . . _20___ - __30__ %
Objective examinations . . . . . _20___ - __30__ %

College Skills - 303

RESEARCH PROJECT

Choose an organ or body system to be the topic of your project. You will become the class specialist on your topic.

brain	lungs	bladder	eyes
heart	gallbladder	uterus	ears
stomach	liver	skin	oral cavity
intestine	spleen	bones	pancreas
kidneys	joints		

Your project will include the following:

Part I: Written Report

This report must include the following:

a.) Title page
b.) Table of Contents
c.) Introduction
d.) Body of the report
    1.) Anatomical description of the topic.
    2.) A labeled picture or drawing of the topic.
    3.) Physiological description of the topic.
    4.) Explanation of the topic's significance to the rest of the human body.
    5.) Description of a disease that affects the topic. Include:
        a.) symptoms
        b.) causes (known, unknown, suspected)
        c.) pathology
        d.) prognosis
        e.) type(s) of physician(s) that might diagnose and treat
        f.) tests that may be used for diagnosis
        g.) options of treatment for the disease
    6.) Description of a surgery, therapy, or treatment that may be prescribed for another disease or condition of the topic.
    7.) Description, name and address of a non-profit organization that could be contacted for more information on the topic or a related disease or condition affecting the topic.
    8.) Explanation of whether or not the topic can be replaced by a transplant or an artificial part.
    9.) Copy of an article from a magazine, newspaper, or journal about the topic with a brief summary.
e.) Conclusion
f.) Glossary - 8 words and definitions.
g.) Bibliography - Minimum of 3 books, 2 encyclopedias, 1 other source - interview, pamphlet, journal.

You will have some class time to work on your project and may bring in sections of your rough draft for suggestions.

College Skills - 303
Research Project (cont.)

Part II: Oral Report

This 5 - 10 minute presentation will cover the information in your report so the class may benefit from your research. The grade for this section of the research project will be on content and presentation.

Remember: When you have a large, long-term assignment, break it down into smaller, more manageable parts. Set your own deadlines and allow plenty of time for proofreading, editing, and writing or typing your final copy.

Dr. Charles Mayo said: "I've never known a man who died of hard work, but many who die of worry."

ASSIGNMENT THREE: IDENTIFYING THE MAIN IDEA

INTRODUCTION

Often, you will be required to write summaries. In addition, you will want to learn how to write summaries because to summarize correctly is to study more effectively, as you will see in Assignment Five.

When you write a summary, you make an indelible impression on your memory. To refresh you memory later - at exam time, for instance--you need only review a few paragraphs of summary rather than pages of printed text.

To start with, then, learn to identify the main idea of a paragraph. In this assignment every paragraph has a main idea that is expressed in a special sentence, a sentence we will call a topic sentence. For example, in the paragraph below, the sentence, Traditionally the vital signs have meant temperature, pulse and respiration contains the main idea of the paragraph. It is the topic sentence.

In making observations about a patient's condition, the nurse frequently starts with the vital signs. Traditionally the vital signs have referred to temperature, pulse, and respiration. In most healthy adults, the normal range for body temperature when taken orally is between 97°F and 100°F. If the temperature is above normal, the term fever or pyrexia

at least two European royal families, and diabetes, a disease that has a high frequency among Jewish women.

3. Human biological changes that occur in the process of maturation and aging also affect health. "Many things can and do go wrong during the process of change," says Du Gas. For example, during the growth period bones may not develop as they should; the endocrine glands may malfunction. Emotional stress frequently occurs as the individual grows from a child to an adult, from adult to parent to middle age, to old age. Problems related to maturing and aging, says Du Gas, are many.

4. Disturbances taking place in the complicated systems of the human body upset health. Such disturbances, Du Gas reports, can occur in the skeletal system, the nervous system, and the digestive system.

5. The environment is such a factor affecting good health that improvement in health that has taken place in North America in the last 75 years is due to regulations to reduce if not eliminate environmental hazards, says Du Gas. We have enacted regulations to make safe our water, food, and milk; we have enacted standards for housing, for work safety, for the control of communicable diseases. Meanwhile, in many developing countries, lack of pure water, inadequate

contributes to diseases such as heart conditons, hypertension, and diabetes. Another such hazard, believe it or not, is malnutrition: it is a fact that in the midst of plenty, certain people follow life styles that concentrate on junk foods or foods with empty calories. A third hazard in the North American life style is our sedentary ways. Our motor cars and television sets, for example, promote a great deal of sitting; whereas we once transported and entertained ourselves, we now sit while other things or other people transport and entertain us. The result is less exercise and a lower degree of physical fitness compared to Swedish adults, for instance. Finally, certain health hazards are "features" of both rich and poor life styles in North America. These include alcoholism, drug addiction, and venereal disease.

8. Health care organizations are the final factor affecting health. Improvement in health care is one of the main causes in the decline in maternal and childhood death as well as the increase in the life span in North America, says Du Gas. "It is necessary to have comprehensive and accessible care for all, with a full range of services -- promotional and preventive as well as curative -- if the highest level of health is to be attained for all our people."

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Appendix

College: _____

Interviewer: _____

Course Name and Program Area: _____

SITE VISIT INTERVIEW SCHEDULE
Vocational Education Programs/Courses Which Have Integrated Basic Skills Instruction into Vocational Curricula

Target Interviews: Deans of Vocational Education
Key Faculty Members
Knowledgeable Administrators

A. Describe the course in general, and how it meets the basic skill needs of students: **(Interviewer, check the box that best describes course -- DO NOT READ)**

[ ] A pre-vocational course that serves students interested in many different vocational areas

[ ] A pre-vocational course that is part of a sequence of courses within a particular vocational program

[ ] A vocational course which has an integrated basic skills component

[ ] A JTPA-linked course that teaches "functional literacy"

_____

_____

_____

_____

_____

_____

_____

_____

OBJECTIVES OF COURSE/PROGRAM

1. How did the college assess the level of student need for and interest in the program/course?

(How did the college assess the level of student need continued)

2. What were the main objectives for integrating basic skills into this particular vocational education program/course?

3. Have competencies for **basic skills** been identified and articulated for this particular integrated vocational program/course? (if yes, obtain copies or sources of competencies).

4. Is there a specific population targeted for the integrated program/course? Describe the students who most benefit from this course/program:

_____

_____

_____

_____

5. What type of credit do students earn for the program/course?

[ ] General education credit for AA or certificate -- number of units _____
[ ] Remedial or Basic Skills credit -- number of units _____
[ ] Vocational education credit -- number of units _____
  [ ] Transferable credit -- number of units _____
  [ ] Non-transferable credit -- number of units _____
[ ] No credit/ no units
[ ] Other (specify): _____

DEVELOPMENT PROCESS

We are particularly interested in learning about the process by which your campus integrated basic skills into vocational education.

6. Who or what was the driving force in developing, and maintaining the [integrated] program/course?

_____

_____

_____

_____

7. Did your campus consult other program/course "models" (or other colleges) as the basis for planning the [integrated] course? If yes, which ones?

_____

_____

8. Describe the level of involvement of each of the following individuals in the development of this [integrated] program/course:

Vocational Faculty: _____

_____

Academic Faculty: _____

_____

Administration: _____

_____

Business and Industry Representatives: _____

_____

Students: _____

_____

9. How was "buy in" from key faculty and administrators obtained?

_____

_____

_____

_____

10. To what extent was there collaboration among vocational and academic faculty in developing the curricula for the integrated program/course?

_____

_____

_____

_____

11. What planning strategies were especially effective in designing this program/course?

12. What barriers, if any, were encountered in integrating basic skills into the vocational education program/course? (PROBE: Credentialing of vocational instructors; Philosophical resistance; Logistical barriers)

13. How were these barriers overcome or their impact reduced?

14. What process was used on your campus to obtain approval for the integrated course?

15. Do you think a similar program/course could be established at other colleges? If yes, what advice would you give colleges which might consider starting such an integrated program/course?

PROGRAM/COURSE DELIVERY

16. How long has the program/course been available to students?

17. How have students been made aware of the program/course and the integrated basic skills component?

_____

_____

_____

_____

18. How many students have enrolled in, and completed the program/course to date?

_____ enrolled in program/course
_____ completed program/course

19. To what extent has the college provided special training or in-service for faculty related to the integrated program/course?

_____

_____

_____

_____

20. What special instructional materials were developed or purchased for the program/course? (ask for copies, particularly if materials were developed by faculty and have not been published)

_____

_____

_____

_____

21. Are any materials associated with this specific program/services copyrighted?

_____

FUNDING

22. How is the program funded? Generally speaking, how much of program/course is funded by the following categories:

[ ]% Carl Perkins Funds/VEA
[ ]% JTPA Funds
[ ]% Adult Education Funds
[ ]% General Funds

[ ]% Other _____
[ ]% Other _____
[ ]% Other _____

_____

100%

23. What additional resources (donation of equipment, volunteer time by industry) have been contributed to this specific program/course by other sources ? If any, please describe:

_____

_____

_____

EVALUATION/EVIDENCE OF SUCCESS

24. What indicators of the program/course's effectiveness have emerged? (may be either documented or undocumented)

[ ] Increased student enrollment in vocational program/course

_____

_____

[ ] Increased student retention in integrated vocational program/course

_____

_____

[ ] Increased student retention in subsequent vocational programs/courses

25. Have you assessed the overall effectiveness of the integrated program/course?
[ ] Yes
[ ] No

If yes, was it a third-party evaluation? What were the outcomes? (Please send copies of any evaluation reports).

If yes, did the evaluation collect data on the impact of the program/course on students' enrollment in and persistence in vocational programs?

Did the evaluation collect data on the impact of the program/course on students' entrance into employment?

26. Are there other ways students benefit from the program/course?

27. To what extent has the program/course undergone changes? What have these changes been, and why were they made?

GENERAL

28. How could the Chancellor's Office best assist your efforts to integrate basic skills into vocational education?

29. What recommendations do you have regarding funding for programs to integrate basic skills and vocational education instruction?

OTHER SPECIFIC QUESTIONS FOR PARTICULAR COLLEGE: